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AFRICA PILOT

PART II

COMPRISING
THE WEST COAST OF AFRICA, FROM RIO DEL REY TO CAPE HANGKLIP; THE ISLANDS IN THE BIGHT OF BIAFRA; THE ISLANDS OF ASCENSION AND ST. HELENA; THE TRISTAN DA CUNHA GROUP AND GOUGH ISLAND

TENTH EDITION
1951

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To be filled in by Navigating Officer.

(In Chart Depôts the first two columns are alone to be filled up.)

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After the publication of Supplement No. 1 each succeeding Supplement cancels the preceding.

Between the time of the volume being taken up for revision and the publication of the new edition no Supplement will be issued, but early in each year a Summary of the Admiralty Notices to Mariners affecting this volume, which have been published during the preceding year, will be issued as a separate publication.

The publication of all Supplements and Summaries of Notices to Mariners is announced in Admiralty Notices to Mariners.

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AFRICA PILOT

VOLUME II

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11 JAN 1954

COMPRISING

THE WEST COAST OF AFRICA, FROM RIO DEL REY TO CAPE HANGKLIP; THE ISLANDS IN THE BIGHT OF BIAFRA; THE ISLANDS OF ASCENSION AND ST. HELENA; THE TRISTAN DA CUNHA GROUP AND GOUGH ISLAND

TENTH EDITION

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1951

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To face page ii.]

CAUTION.

IN THIS WORK THE BEARINGS ARE REFERRED TO THE TRUE COMPASS, AND WHEN GIVEN IN DEGREES ARE RECKONED CLOCKWISE, FROM 000° (NORTH) TO 359°.

THE BEARINGS OF LIGHTS ARE GIVEN FROM SEAWARD.

THE LATITUDES AND LONGITUDES GIVEN IN THE TEXT ARE APPROXIMATE.

THE DISTANCES ARE EXPRESSED IN SEA-MILES OF 60 TO A DEGREE OF LATITUDE.

A CABLE'S LENGTH IS ASSUMED TO BE EQUAL TO THE TENTH PART OF A SEA-MILE. IT IS OFTEN ACCEPTED AS BEING ONE-TENTH OF A NAUTICAL MILE.

THE DEPTHS ARE GIVEN BELOW CHART DATUM LEVEL WHERE NOT OTHERWISE STATED.

HEIGHTS ON THE LAND ARE GIVEN ABOVE MEAN LEVEL OF HIGH WATER SPRING TIDES.

FIGURES IN BRACKETS GIVEN AFTER THOSE DENOTING FEET, FATHOMS AND YARDS ARE THEIR EQUIVALENTS IN METRES.

TIME IS EXPRESSED IN THE FOUR-FIGURE NOTATION COMMENCING AT MIDNIGHT.

THE TERM "POWER VESSEL" USED HEREIN INCLUDES ANY VESSEL PROPELLED BY MACHINERY.

A NAME IN BRACKETS, IMMEDIATELY FOLLOWING ANOTHER NAME, IS THE OBSOLETE NAME WHICH IS STILL SHOWN ON THE ADMIRALTY CHARTS. AS A GENERAL RULE, THE BRACKETED NAME IS ONLY INSERTED IN THE DESCRIPTION OF THE PLACE OR OBJECT PREVIOUSLY BEARING THAT NAME.

WHEN SHADING IS USED TO INDICATE COLOURS OF FLAGS, TIDAL LIGHT SIGNALS, OR BEACONS, IT IS AS FOLLOWS:

░	▥	▤	▧	■
Yellow.	Red.	Blue.	Green.	Black.

ADVERTISEMENT TO THE TENTH EDITION

Africa Pilot, Volume II, contains a description of the west coast of Africa from Rio del Rey to Cape Hangklip, with the islands of Fernando Póo, Principe, São Tomé, Annobon, Ascension, St. Helena, the Tristan da Cunha group, and Gough island.

This, the tenth edition, has been prepared by Captain G. A. French, Royal Navy, and contains the latest information received in the Hydrographic Department.

The meteorological information has been revised by the Meteorological Office of the Air Ministry. Temperature is expressed in degrees Fahrenheit, rainfall in inches, speed in knots, and distance in sea miles, unless expressly stated otherwise. Information received from meteorological services which do not use these units has been converted into the units mentioned above by the Meteorological Office.

Mariners and others are invited, in the interests of navigation, to forward to the Hydrographer of the Navy, Admiralty, Oxgate Lane, Cricklewood, London, N.W.2, any information that may come under their notice, which would be useful for the correction of the charts and other hydrographic publications issued by the Admiralty; *early* advice as to newly-discovered dangers, the establishment of, or changes in, any aids to navigation, is specially requested.

Copies of a form (H.102) on which to render information can be obtained *gratis* from the Hydrographer of the Navy, Hydrographic Supplies Establishment, Creechbarrow House, Taunton, Somerset, or from any of the Admiralty Chart Agents in Great Britain and abroad, a list of whom is published, annually, in Admiralty Notice to Mariners No. 2.

By the publication of this volume, the ninth edition of Africa Pilot, Part II, 1939, and Supplement No. 8, of 1951, are cancelled, and all information affecting that work contained in Notices to Mariners, up to and including No. 2253 of 1951, has been embodied in this volume.

For Temporary and Preliminary Notices to Mariners affecting this edition, the list of Temporary and Preliminary Notices to Mariners in force, published monthly in the weekly edition of Admiralty Notices to Mariners, should be consulted.

A. DAY,
Rear-Admiral,
Hydrographer of the Navy.

Hydrographic Department,
Admiralty, London,
30th November, 1951.

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The Statesman's Year Book, 1951.

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Year Book and Guide to Southern Africa, 1951.

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FRENCH

Instructions Nautiques, Côte Ouest d'Afrique, 1943, 2nd Vol., with Supplement 1950.

Phares et Signaux de Brune, Série C ; Manche Océan Atlantique-Est, 1948 ; with addendum.

PORTUGUESE

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SPANISH

Faros y Señales de Niebla, Parte I, 1951.

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GLOSSARY

OF FOREIGN GEOGRAPHICAL TERMS, ETC., OCCURRING ON THE CHARTS AND IN THE SAILING DIRECTIONS

PORTUGUESE—ENGLISH

Portuguese	English	Portuguese	English
Angra	Harbour	Mangue	Mangroves
		Moita	Bushes
Baia	Bay	Monte, Montanha	Mountain
Baixo	Bank, shoal	Morro	Headland, Bluff
Balsa	Rock, shoal	Moyen	Middle
Banco	Bank, shoal		
Barra	Bar (of river, etc.)	Novo	New
Branco	White		
		Palmeiras	Palm trees
Cabeço	Head	Pedra	Rock above water
Cabo	Cape	Pequena, Pequeno	Little
Castello	Castle	Ponta	Point
Colina	Hill	Porto	Harbour
		Praia	Beach
Enseada	Cove, haven	Preto	Black
Fortaleza	Fort	Recife	Reef
		Ribeira	River
Grande	Large	Rio	River
		Roca	Rock
Ilha	Island		
Ilhéu	Islet	São, Santa	Saint
Laguna, Lagoa	Lagoon	Villa	Village

SPANISH—ENGLISH

Spanish	English	Spanish	English
Agudo	Pointed, sharp	Monte, Montana	Mountain
Arena	Sand		
Arroyo	Rivulet		
		Negro	Black
		Nuevo	New
Bahia	Bay		
Banco	Bank, shoal		
Bajo	Sandbank, shoal	Oscuro	Dark
Cabo	Cape	Pequeno	Small
Chico	Small	Pico	Peak
		Piedra	Stone, rock
		Punta	Point
Ensenada	Cove, bay		
		Rada	Roadstead
Grande	Large	Rio	River
		Roca	Rock
Isla	Island		
Isleta, Islote	Islet	San, Santa, Santo	Saint

FRENCH—ENGLISH

French	English	French	English
Archipel	Archipelago	Mamelles	Paps
		Milieu	Middle
Baie	Bay	Mont	Mountain
Banc	Bank, shoal	Montagne	
Barre	Bar (of river, etc.)		
Bois	Wood	Noir	Black
Bouche	Mouth (of river)	Nord	North
Canal	Channel		
Cap	Cape	Ouest	West
Chenal	Channel		
Colline	Hill		
Crique	Creek	Passe	Pass, channel
		Petit	Small
		Pointe	Point
Est	East	Presqu'île	Peninsula
Faux	False		
Fleuve	River	Quai	Quay
Golfe	Gulf		
Grand	Large	Rade	Road, Roadstead
		Recif	Reef
Haut	High	Rivière	River
		Roche, rocher	Rock
Île	Island		
Îlot	Islet	Sud	South
Jetée	Jetty, pier		
		Tête	Head
Lac	Lake		
Lagune	Lagoon	Ville	Town

SYSTEM OF ORTHOGRAPHY

The following rules for the spelling of geographical names (termed the R.G.S. II system) have been adopted for British official use, and the names in Admiralty Hydrographic publications will be rendered in accordance with these rules as opportunity occurs.

In new editions of the various volumes of sailing directions names are, generally speaking, given in accordance with these rules, but where the name on the chart shows an older rendering of a name, such chart name is given in brackets after the new rendering and will also be given in the Index.

The rules for spelling in the R.G.S. II system are as follows:—

(1) The spelling of every place-name in an independent country or self-governing dominion using the Roman alphabet (including " Roman " alphabets containing extra or modified letters, such as Czech, Serb-Croat, Polish, Romanian, etc.) shall be that adopted by the country or dominion.

(2) In colonial possessions the spelling of such place-names as belong to languages coming under Rule (1) will be spelt in accordance with that rule.

(3) The accents and diacritical marks in official use by the above countries will be retained. Wherever it appears desirable, the pronunciation will be shown by giving the name as transliterated on the system below.

(4) All other place-names throughout the world will be spelled in general accordance with the following system.

The broad features of this system are

(*a*) That vowels are pronounced as in Italian and consonants as in English:

(*b*) That every letter is pronounced, and no redundant letters are used.

This system aims at giving a close approximation to the *local* pronunciation; but it is recognised that in some languages, notably Russian, Greek, and Arabic, the necessity for letter-for-letter transliteration often renders this impossible.

TABLE OF SPELLING AND PRONUNCIATION R.G.S. II.

a	The long and short Italian vowels, as in *lāvă* ..	Somāli; Răvennă.*
ä	Between *a* in *fat* and *e* in *eh*?; chiefly in Teutonic and Finno-Ugrian languages	Mähring; Pärnu.
ai	The two Italian vowels, frequently diphthongal, almost as in *aisle*; but pronounced *ei* and *ĕ* in Greek names..	Wadai; Shanghai.
au	The two Italian vowels; frequently diphthongal; almost as *ou* in *out*	Sakau; Bauchi.
aw	When followed by a consonant, or when terminal, as in *awl, law*	Dawna; Saginaw.
b	As in English.	
c	Not to be used, but always replaced by *k* or *s*; except in the compound *ch*, and in many conventionally-spelt words, as	Kandahar; Serang. Calcutta; Celébes.
ch	As in *church*; never *tch* or *tsch* for this sound ..	Chad; Kerch.
d‡	As in English.	
dh	Soft *th* as in *they*; a slight *d* sound sometimes preceding it in Semitic languages	Hadhramaut; Riyadh.
e	Long as in *eh*? short as in *bet*. (For the *e* sound in the French *je*, see note at end on the "neutral vowel.")	Gēlo; Mafĕking.*
(ee)	Used for *i* (*q.v.*) only in a few conventional names	Darjeeling; Keelung.
ei	The two Italian vowels, frequently diphthongal as in *rein*, but pronounced *i* in Greek names ..	Beirut; Raheita.
(eu)	Not used as a single sound.	
f	As in English; *ph* must not be used for this sound	Mustafa; Maidan-i-Naftun.
g	Hard, as in *get, gift*: never as in *gem, gin* ..	Gedáref; Gilgit.
gh	Soft guttural, the Arabic *ghain*	Ghadames; Baghdad.
h	Used only when sounded; or in the compounds *ch, dh, gh, kh, sh, th, zh*	Ahmadabad; 'Abdullah.
i	Long as in *marine*; short as in *piano*	Fiji; Kibonde.
j	As in English; except in transcription of Chinese, where it equals *zh*, or the French *j*	Juba, Ujiji (Eng. *j*); but Jaoping (Fr. *j*).
k	As in English; hard *c* should never be used (except in conventionally-spelt words)—thus, not Corea, Cabul, but	Korea; Kabul.
kh	Hard aspirated guttural, as in the Scottish *loch* (not as in *lock*)	Khan; Sebkha.
l‡ **m** **n‡**	As in English.	

*The long and short symbols given here are merely for explanation, not for use.

‡See note at end on *Liquid Sounds*.

ng	Has three separate sounds, as in *vanguard, finger,* and *singer.* If necessary to distinguish, a hyphen may be placed, as in *van-guard, singer-* ..	In-galla ; Bongo ; Ng-ami ; Tong-a.
ngg	May be used for the sound of *ng* as in *finger* ..	Trengganu ; Yanggang-a.
o	Long as in *both*¶ : short as in *rotund*	Kigōma ; Hŏnŏlulu.*
ö	As in German ; equals the French *eu* in *peu* ; or nearly the English sound in *fur*	Baiköl.
(oo)	Used for *u* (*q.v.*) only in a few conventional names, chiefly Indian and Chinese	Poona ; Foochow.
oi	The two Italian vowels ; frequently diphthongal as in *oil*, but pronounced like *i* in *fit* in Greek names	Hanoi.
öi	The diphthong as in French *oeil* and Norwegian *höi*	Höiland.
ou	Dissyllabic, and not as French or English *ou*, except in Greek names where it has the French value	Zlatoust ; Yaroúa.
ow	Used as a diphthongal combination of *ŏ* and *w* only in the romanisation of Chinese	Hankow.
p	As in English.	
ph	As in *loophole* ; not to be used for the *f*-sound, except conventionally	Chemulpho ; Haiphong.
q	Represents *only* the Arabic *qaf* and the Hebrew *qof* ; i.e. a guttural *k* (as a rule)	Qena ; Qiryath.
qu	Should never be employed to represent the sound of *kw* ; thus, not Namaqua, Quorra, but	Namakwa ; Kworra.
r	As in English ; should be distinctly pronounced.	
s‡	As English *ss* in *boss*, not as in *these* or *pleasure*	Burgos ; Masikesi.
sch	As in *discharge*	Peschanka.
sh **t‡**	As in English.	
th	Hard *th* as in *thick*, not as in *this* (except conventionally in Fijian)	'Athlith ; Thingvellir.
u	Long as in *rude*, or as *oo* in *boot* ; short as in *pull*	Zūlū ; Rŭanda.*
ü	As in German : equals the French *u*, as in *tu* (Fr.)	Üsküdar.
v **w** **x**	As in English.	
y	Always a consonant, as in *yard* ; it should not be used as a terminal vowel, *e* or *i* being substituted ; e.g. not Kwaly or Wady, but	Kikuyu ; Maya. Kwale ; Wadi.
z	As in *gaze*, not as in *azure*.	
zh	As the *s* in *treasure*, the *z* in *azure*, or the French *j* in *je* ; but for the sound in Chinese use *j* (*vide* note under *j*)	Zhob.

*The long and short symbols given here are merely for explanation, not for use.
‡See note at end on *Liquid sounds*.

¶The true Italian ō is broader than this ; almost as in *broth* (= R.G.S. II *aw*). The letter *o* is conventionally used for this sound in certain names in Nigeria, Tonga, etc. : e.g. Oyo, Fofoa.

NOTES.

The doubling of a vowel or a consonant is only necessary when there is a distinct repetition of the single sound, and should otherwise be avoided	Nuusafee; Moorea; Jidda; Muhammad.
Accents should not generally be employed; but in order to indicate or emphasise the stress, an acute accent may be used	Saráwak; Qántara; Tong-atábu; Paraná.
A long or short mark over a vowel (e.g. ā, ŏ) should only be used (and that sparingly) when without it there would be danger of mispronunciation ..	Kūt; Kyōto; Abŏso.
Hyphens will not be used except to indicate pronunciation and with the particle *-i-* (in Persian, Fijian, etc.)	Ta-if; Pusht-i-Kuh; Nuku-i-Ra.

Inverted comma and apostrophe.—The inverted comma ' is employed only to represent the Arabic *'ain*, the Maltese *'ghain*, and the Hebrew *'ayin*. The apostrophe ' in foreign words indicates a liquid sound (*see* below).

Liquid sounds.—The occasional "liquid" or "palatalised" sound of *d, l, n, s, t*, etc. (as in *d'you, lure, new, pursue, tune*, etc.) is as a rule sufficiently represented by a following *y*; where, however, owing to a following consonant, or to the palatalised letter coming at the end of a word, the *y* is inapplicable, the liquid sound will be represented by an apostrophe, thus: *d', l', n', s', t'*, etc.

The "Neutral vowel."—The "indeterminate" or "neutral" vowel sound (*er*), i.e. the sound of *a* in *marine*, *e* in *often*, *i* in *stir*, *io* in *nation*, *o* in *connect*, *ou* in *curious*, *u* in *difficult*, etc., *e* in French *je*, or the often unwritten vowel (*Fat-ha*) in Arabic, etc., is represented as a rule by *a*: as in Basra, Hawiya; but sometimes by *e*, when the sound approximates more to *e* than to *a*: as Meshed, El Gezira.

(In any guide to pronunciation issued by the Permanent Committee on Geographical Names, the "neutral vowel" is represented generally by the italic *e*: occasionally also by italic *a* or *u*.)

This sound must not be confused with *e-mute*, where the *e* is not sounded at all: as in Abbeville.

Nasal vowels.—In illustrating the pronunciation of French, Portuguese, Polish, etc., nasal vowels, the nasalisation will be represented by italic *n*; as Czestochowa pr. Chā*n*stokhóva.

Note.—The Royal Geographical Society has published a book entitled "Alphabets of Foreign Languages transcribed into English according to the R.G.S. II system." This book enables the correct rendering of names to be obtained, also of names in languages which are transliterated letter for letter.

INFORMATION RELATING TO ADMIRALTY CHARTS AND PUBLICATIONS, GENERAL NAVIGATION, AND GENERAL METEOROLOGY.

ON THE CORRECTION OF ADMIRALTY CHARTS.

Guides to Navigation.—In addition to the charts, the navigational publications which are primarily affected by the continual changes and alterations that take place are the Admiralty Sailing Directions, the Admiralty List of Lights, Fog Signals and Visual Time Signals, and the Admiralty List of Radio Signals. The Admiralty Notices to Mariners contain information mainly for the correction of the charts and navigational publications.

CHARTS.

1. **Degree of Reliance.**—It should be clearly understood that the value of a chart depends on the character of the original survey and on the completeness of the reports of subsequent changes. The remarks on "The Use of Charts as Navigational Aids, &c." which are subjoined should be carefully studied in this connection.

2. **System of Dating and Issue of Corrected Copies.**—Admiralty charts after first publication are kept corrected by means of new editions, large corrections, and small corrections. Copies of charts issued by the Hydrographic Supplies Establishment, Admiralty Chart Agents or Admiralty Chart Depôts are corrected, except from temporary and preliminary Notices to Mariners, for all navigational information to the date of issue.

New Charts.—The date of publication of a chart is shown outside the bottom margin, in the middle, e.g. :—

Published at the Admiralty 30th May, 1947.

New Editions.—When a chart is revised throughout and modernised in style a new edition is published, the date being shown outside the bottom margin and to the right of the date of publication, e.g. :—

New Edition 2nd Jany., 1947.

All large and small corrections notations are at the same time erased, and all old copies of the charts are cancelled.

Large Corrections.—When a chart is corrected from important information which is too comprehensive to promulgate by Admiralty Notice to Mariners or to insert conveniently by hand on existing copies, but when the chart is not revised throughout, the date on which these corrections are made is shown on the chart outside the bottom margin and to the right of the date of publication, and in the case of a chart already marked with a new edition date, below such date, e.g. :—

Large corrections 10th Feb., 1947.

All small corrections notations are at the same time erased, and all copies of the chart are cancelled.

Small corrections.—

(*i*) When a chart is corrected from the information promulgated in an Admiralty Notice to Mariners (except temporary and preliminary Notices), the year, if not already shown, and number of the notice are entered in the bottom left-hand corner of the chart, e.g. :—

Small corrections 1947–*903.*

Copies of the chart stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents and the Admiralty Chart Depôts are corrected by hand from such information.

(*ii*) When a chart is corrected from information which is considered of no importance from the standpoint of safe navigation, and which is, therefore, not promulgated in an Admiralty Notice to Mariners, the year, if not already shown, and date of the correction are entered on the chart, in one of two ways, in the bottom left-hand corner below the margin and in sequence, with the notations referred to in the preceding paragraph, e.g. :—

Small corrections, 1947—$\boxed{5.20}$—

or Small corrections 1947—(VI.*25*)

These indicate that the chart received minor corrections on the 20th May, or 25th June, respectively.

In such cases copies of the chart held by ships and establishments are not usually replaced by new copies, but in exceptional cases, e.g., when new compasses are inserted, new copies of the charts may be supplied. It should, however, be particularly noted that the absence of corrections represented by square or bracket dates from a chart does not invalidate it for navigation.

3. **Correction of Charts in Ships.**—All small but important corrections affecting navigation that can be made to the charts by hand are promulgated in Admiralty Notices to Mariners and, with the exception of corrections from temporary or preliminary Notices, should at once be neatly made in waterproof violet ink on the charts affected, the year (if not already shown) and numbers of the notices being inserted, also in waterproof violet ink, in the bottom left-hand corner of the chart. The recognised abbreviations shown on Admiralty chart No. 5011 ("Signs and abbreviations used on Admiralty Charts") should be used.

Generally speaking, the amount of information which should be inserted on a chart should be in accordance with that already shown.

On large scale charts, the abridged descriptions, as shown on chart No. 5011, of all details of all lights, light-buoys and fog signals, and the year dates of obstructions, reported shoals, dredged channels, depth on bars or in shifting channels, and irregularities of lights, should be inserted.

On coastal charts, the abridged descriptions of only the principal lights and fog-signals, i.e., those to assist in approaching or making the land, should be inserted.

Particulars of such lights should be omitted, in the following order, as the scale of the chart decreases, viz. :—

(i) Elevation, (ii) Period, (iii) Number in Group, and (iv) Visibility.

Particulars of fog signals should be inserted in their appropriate positions if space permits, but should otherwise be entered in a tabulated list under the title or some other convenient place on the chart.

Inner harbour light-buoys and beacons should not be inserted on coastal charts, and against other light-buoys only the character of the light should be inserted.

On ocean charts, lights which are visible 15 miles or over should alone be inserted and then only their character and colour.

On all charts, writing should be inserted as much as possible clear of the water, unless the relative objects are on the water, and care should be taken not to obliterate any information already on the chart. When cautionary or tidal notes, &c., are inserted, they should be written in a convenient but *conspicuous* place, preferably near the title, where they will not interfere with other details.

Erasures should never be made but the details should, when necessary, be crossed through in waterproof violet ink.

Admiralty Notices to Mariners are occasionally accompanied by reproductions of portions of charts (known as " blocks "), and when correcting charts from such blocks the following points should be borne in mind :—

(i) A block may not only indicate the insertion of new information, *but also the omission of matter previously shown.* The latter would, however, invariably be mentioned in the text of the Notice, and the fact that a block accompanies a Notice should not cause the text of the Notice to be disregarded.

(ii) The limiting lines of a block are determined for convenience of reproduction and need not be adhered to when cutting out for pasting on the chart, provided that the point mentioned in the preceding paragraph is taken into consideration.

(iii) The new information shown on a block can sometimes be inserted on the chart by hand, the reason for issuing a block in such a case being to avoid a long description of the new information in the text of the Notice.

(iv) Owing to distortion the blocks do not always fit the charts exactly, care should therefore be taken when pasting a block on to a chart that the more important navigational corrections fit as closely as possible. This can best be assured by fitting the block while it is dry and making two or three pencil ticks round the edges for use as fitting marks after the paste is applied.

Corrections from Temporary or Preliminary Notices to Mariners should be inserted on the charts *in pencil* and the year and number of the notice should be shown against them, e.g. :—N.M. 625/1947 temp., and also in the bottom left-hand corner of the chart, in pencil, *below* the small corrections notations (*see* above). Temporary corrections should be rubbed out when the notice is received cancelling them, but preliminary corrections should be inked in when the notice is received reporting that the changes have been made.

Charts stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents and the Admiralty Chart Depôts are *not* corrected from Temporary or Preliminary Notices to Mariners, and when charts are received from one of these sources they should be corrected in pencil as necessary from the copies of such Notices already held, or from those supplied with the charts.

Corrections from Radio Navigational Warnings concerning derelicts and drifting obstructions, the temporary extinction of lights, displacement of important aids to navigation, ice reports, &c., should also be noted *in pencil*, as received, on the charts affected. Radio Navigational Warnings of a permanent nature and those relating to derelicts and drifting obstructions dangerous to navigation are re-issued in the form of Admiralty Notices to Mariners, but other warnings are not re-issued in this way, except in special circumstances.

Corrections from information received from authorities other than the Admiralty should be noted, *in pencil*, on the charts affected, but no charted danger is to be expunged without the authority of the Hydrographer of the Navy.

NAVIGATIONAL PUBLICATIONS.

1. Admiralty Sailing Directions, Supplements, &c.—The Admiralty Sailing Directions, consisting of about 73 volumes for the whole world, contain general information useful to the navigator.

An index chart bound near the beginning of each volume shows the area dealt with and the serial numbers and limits of all Admiralty charts for the area which were published *when the volume was printed.*

Each volume is periodically revised throughout, and, in the intervals between the publication of new editions, Admiralty Notices to Mariners and Supplements are published to enable the volume to be corrected. It should, however, be clearly understood that Sailing Directions cannot be correct in all minor details after the date of the latest Supplement.

The above-mentioned corrections are not made in the Sailing Directions stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents or the Admiralty Chart Depôts.

A new edition of each volume of Sailing Directions is published at intervals of approximately from ten to twelve years. The number of the latest Admiralty Notice to Mariners used in its compilation is given in the " Advertisement " on page iii of each volume, and the numbers of the Notices affecting it between the dates of going to press and issue to ships and establishments are given in the Notice announcing its publication, to enable the new edition to be corrected before being brought into use.

A Supplement to each volume is generally published annually, each succeeding Supplement cancelling the former. When a volume is taken up for revision, however, no further Supplement to that edition is issued, but subsequent Notices to Mariners affecting it are summarised each year and issued as a separate publication, until the new edition of the volume is published.

A tabular form for notation of the existence of Supplements and Summaries of Notices is printed on the front fly-leaf of all Sailing Directions, and these notations are made as necessary in all copies issued by the Hydrographic Supplies Establishment and the Admiralty Chart Depôts.

Supplements and Summaries of Admiralty Notices to Mariners should be retained intact. *Whenever reference is made to the Sailing Directions, the Supplement, and where applicable the Summary, must be consulted.* The existence of a Supplement or Summary of Admiralty Notices to Mariners is to be entered in the tabular form inside the cover of the Sailing Directions. New and amended information appearing in the Supplements for the first time is indicated by square brackets, and deletions from the previous Supplement are indicated by horizontal lines.

Admiralty Notices to Mariners affecting Sailing Directions *are not* to be cut up and pasted in, but the book is to be annotated in the margin, or corrected in manuscript, as convenient.

2. The Admiralty List of Lights, Fog Signals and Visual Time Signals.—The Admiralty List of Lights, Fog Signals and Visual Times Signals for the world is issued in twelve volumes divided geographically as shown on the index chart at the beginning of each volume.

Light-buoys are *not* included in the list.

The volumes are published annually at the rate of one volume per month commencing with Volume 1 about March and ending with Volume 12 about February. Supplements to these volumes will not be issued.

Each volume will be issued with an inscription on its cover and title page stating the date to which the volume has been corrected, which will be approximately six weeks prior to the date of its issue. Corrections or additions to each volume, which may occur between the date of correction and date of issue, will be promulgated by Section III of Admiralty Notices to Mariners.

Amendments.—Important amendments are promulgated in Admiralty Notices to Mariners. In Section III of each Weekly Complete Edition of these Notices will be found all additions and alterations made to Lights, Fog Signals and Visual Time Signals by the Notices issued during the week affected; certain other additions and alterations are also included in Section III, which, though not of sufficient importance to necessitate the issue of a Notice to Mariners, will be found of use to the seaman.

Corrections to the Light Lists should be made in pencil, or extracted from Section III and pasted in the appropriate volume.

Note.—Corrections are not made in copies of the Lists of Lights, &c., stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents or the Admiralty Chart Depôts, and copies received from these sources should accordingly be corrected from the weekly editions of the Notices to Mariners before being brought into use.

3. The Admiralty List of Radio Signals.—The Admiralty List of Radio Signals is issued in three volumes.

Volume I.—Communications—Comprises particulars of radiotelegraph coast stations, together with general regulations; it also includes such subsidiary services as medical advice supplied by radio.

Volume II.—Navigational Aids—Comprises particulars of services from direction-finding stations, radiobeacons, and radio navigational aids (position fixing systems) together with radio time signals and navigational warnings (with ice signals); all relevant codes and regulations will be found in this volume.

Volume III.—Meteorological Services—Comprises particulars of weather services provided for the use of shipping, together with relevant codes and lists of meteorological observation stations.

New editions of each volume will normally be published annually.

All corrections subsequent to the date of publication are promulgated in Section VI of the complete weekly edition of Admiralty Notices to Mariners.

Copies of the List stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents or the Admiralty Chart Depôts are not kept corrected, and Lists received from these sources should accordingly be corrected from the weekly editions of the Admiralty Notices to Mariners before being brought into use.

4. **The Admiralty Tide Tables.**—The Admiralty Tide Tables are published in three sections as follows :—

For " EUROPEAN WATERS (including Mediterranean Sea)."
For " ATLANTIC AND INDIAN OCEANS."
For " PACIFIC OCEAN AND ADJACENT SEAS."

Each section contains two parts, Part I giving tidal predictions for Standard Ports and tidal stream predictions for certain straits and channels. Part II giving data for predicting tides at places which are not Standard Ports.

Admiralty Tide Tables, Part III, contains instructions for predicting tides and tidal streams, and for analysing observations of tides and tidal streams, with tables to assist prediction and analysis.

THE USE OF CHARTS AS NAVIGATIONAL AIDS AND GENERAL REMARKS RELATING TO PRACTICAL NAVIGATION.

(1) **Reliance on a chart.**—The value of a chart must manifestly depend upon the accuracy of the survey on which it is based, and this becomes more important the larger the scale of the chart.

To estimate this the date of the survey, which is always given in the title, is a good guide. Besides the changes that, in waters where sand or mud prevails, may have taken place since the date of the survey, the earlier surveys were mostly made under circumstances that precluded great accuracy of detail, and, until a plan founded on such a survey is tested, it should be regarded with caution. It may, indeed, be said that, except in well-frequented harbours and their approaches, no surveys yet made have been so minute in their examination of the bottom as to make it certain that all dangers have been found. The fullness or scantiness of the soundings is another method of estimating the completeness of a chart. When the soundings are sparse or unevenly distributed, it may be taken for granted that the survey was not in great detail.

It appears to be insufficiently realised that the degree of reliance which may reasonably be placed upon an Admiralty chart, even in surveys of modern date, is mainly dependent on the scale on which the survey was made. The scale for publication is now generally that of the original survey, except in the case of coast sheets which are sometimes reduced. It should not, therefore, be assumed that the original survey was made on a larger scale than that published.

It must be borne in mind that the principal method of ascertaining the inequality of the bottom of the sea is by the laborious process of sounding, and that in sounding over any area, the boat or vessel obtaining the soundings is kept on given lines; that each time the lead descends, or a sonic sounding is taken, the depth over only a small area is obtained, in the case of the lead, it has a diameter of only a few inches, and that consequently each line of soundings, though miles in length, is only to be considered as representing a narrow width.

Surveys are not made on uniform scales, but each survey is made on a scale commensurate with its apparent importance. For instance, a general survey of a coast which vessels only pass in proceeding from one place to another is not usually made on a scale larger than one inch to the nautical mile, while surveys of areas where vessels are likely to anchor are made on a scale of three inches to the mile, and surveys of frequented ports or harbours likely to be used by fleets, on a scale of from six inches to ten inches to the nautical mile.

Close examination by sounding is the only method by which surveys on a large scale can be made, and in view of the vast mileage of surveys yet requiring completion in the interests of navigation, it would be a waste of time to undertake large-scale coast surveys.

The scale on which a survey is to be conducted having been settled, it is manifestly superfluous to obtain more lines of soundings than can be represented on the paper. 100 soundings, which is the maximum number that can be placed with clearness on every square inch of paper, means that on a scale of one inch to the mile each sounding on the chart occupies an area representing eight acres of actual ground, whilst on a scale of six inches to the mile each sounding represents an area of a little less than a quarter of an acre, i.e., of 100 feet square.

The following diagram represents as many soundings as can be placed legibly on a square inch of paper:—

16	15	15	13	13	14	12	11	10	9
14	15	14	14	13	13	12	11	9	8
15	15	14	17	16	14	13	10	10	9
16	16	17	18	16	12	11	8_3	9	10
18	17	15	12	9	7_3	7_4	7_4	9	10
19	16	12	9	5_3	4_4	5_4	6_4	8_3	9
22	19	16	10	3_4	5_1	6_1	7_3	8_3	10
20	16	12	7_1	5_4	6_1	6_4	7_1	8_3	10
18	15	11	9	7_3	7	7_3	8_3	10	11
20	17	14	11	12	10	9	10	11	13

Little assistance in detecting excrescences on the bottom is afforded by the eye, when sounding in a boat, even in clear water, on account of the observer being within five feet of the surface; none in turbid seas. If, therefore, there is no inequality in the soundings to cause suspicion, a shoal patch between two lines may escape detection.

Thus, in a chart on a scale of one inch to the mile, an inequality of some acres in extent rising close to the surface, if it happened to be situated between two lines, might escape detection; whilst in a chart on a scale of 6 inches, inequalities as large as battleships, if lying parallel with, and between the lines of soundings, might exist without detection if they rose abruptly from an otherwise even bottom.

General coast charts should not, therefore, be looked upon as infallible, and a rocky shore should on no account be approached within the ten-fathom contour line, without taking every precaution to avoid a possible danger; and even with surveys of harbours on a scale of 6 inches to the mile vessels should avoid, if possible, passing over charted inequalities in the ground, as some isolated rocks are so sharp that the lead may not find the highest part. Better results can, however, be obtained by sonic sounding owing to the rapidity with which such soundings can be taken, but even this method will not find rocks unless the boat or vessel be directly over them.

Blank spaces among soundings mean that no soundings have been obtained in these spots. When the surrounding soundings are deep it may with fairness be assumed that in the blanks the water is also deep; but when they are shallow, or it can be seen from the rest of the chart that reefs or banks are present, such blanks should be regarded with suspicion.

Soundings in hair line, which are shown on the latest charts in upright figures, and on other charts in sloping figures, indicate that such soundings have been taken from smaller scale charts, an unreliable source, or adapted from old and imperfect surveys.

(2) **Fathom lines a caution.**—Except in plans of harbours that have been surveyed in detail, the six-fathom line on most Admiralty charts is to be considered as a caution or danger line against unnecessarily approaching the shore or bank within that line, on account of the possibility of the existence of undiscovered inequalities of the bottom, which nothing but an elaborate detailed survey could reveal. In general surveys of coasts or of little frequented anchorages, the necessities of navigation do not demand the great expenditure of time required for such a detailed survey. It is not contemplated that ships will approach the shore in such localities without taking special precautions.

The ten-fathom line is, on rocky shores, as before mentioned, another warning, especially for ships of deep draught.

Charts on which no fathom lines are marked must be especially regarded with caution, as it generally means that soundings were too scanty and the bottom too uneven to enable them to be drawn with accuracy.

Isolated soundings, shoaler than surrounding depths, should always be avoided as there is no knowing how closely the spot may have been examined.

(3) **Chart on largest scale always to be used.**—It sometimes happens that from press of work, only the copper plate of the larger scale chart of a particular locality can at once receive any extensive re-arrangement of coastline or sounding. This is an additional reason, besides the obvious one of the greater detail shown, why this largest scale chart should always be used for navigating.

(4) **Caution in using small-scale charts.**—In approaching the land or dangerous banks, regard must always be had to the scale of the chart used. A small error in laying down a position means only yards on a large-scale chart, whereas on a small scale the same amount of displacement means large fractions of a mile.

For the same reason bearings to near objects should be used in preference to objects farther off, although the latter may be more prominent, as a small error in bearing or in laying it down on the chart has a greater effect in misplacing the position the longer the line to be drawn.

(5) **Graduation.**—All plans are now being graduated in skeleton style before publication in order to facilitate easy reference to astronomical positions; previously published plans are also graduated as opportunity offers. The graduation is, however, of necessity often

based upon imperfect information of a conflicting nature; for this reason, whenever an astronomical position is quoted other than approximate (i.e., when seconds are given), it is necessary to quote also the number of the particular chart from which the position has been derived.

In this connection it is pointed out that, whenever possible, a position should be transferred from one chart to another by bearing and distance from a distinguishing feature common to both, such as a point of land or a light, &c., and not by the graduation which may differ owing to one of the charts being constructed on later and more complete astronomical data than the other.

(6) **Distortion of printed charts.**—The paper on which charts are printed is, from various causes, subject to distortion, but the effect of this is seldom sufficient to affect navigation. It must not, however, be expected that accurate series of angles taken to different points will always exactly agree when carefully plotted upon the chart, especially if the lines are to objects at some distance. The larger the chart the greater the amount of this distortion.

(7) **Buoys.**—It is manifestly impossible that any reliance can be placed on buoys always maintaining their exact position. Buoys should, therefore, be regarded as warnings and not as infallible navigating marks, especially when in exposed positions; and a ship should always, when possible, be navigated by bearings of fixed objects on shore or angles between them, and not by buoys.

(8) **Light-buoys.**—The lights shown by light-buoys cannot be implicitly relied on, as, if occulting or flashing, the apparatus may get out of order, or the light may be altogether extinguished. These lights in the British isles are from 5 to 217 candle-power.

(9) **Cable-buoys.**—Cable-buoys marking the ends of submarine cables usually are spherical or can-shaped, surmounted by a globe and occasionally a flag. Below the topmark two *white fixed* lights, disposed horizontally, may be exhibited, but they cannot be implicitly relied on.

(10) **Lights.**—Arcs drawn on charts round a light are not intended to give information as to the distance at which it can be seen, but solely to indicate, in the case of lights which do not show the same characteristics or colours in all directions, the bearings between which the differences occur.

All the distances given in the Admiralty List of Lights and on the charts for the visibility of lights are calculated for a height of an observer's eye of 15 feet. The table of distances visible due to elevation, at the beginning of each volume of the Admiralty List of Lights, affords a means of ascertaining how much more or less the light is visible should the height of the eye be more or less. The glare of a powerful light is often seen far beyond the limit of visibility of the actual rays of the light, but this must not be confounded with the true range. Again, refraction may often cause a light to be seen farther than under ordinary circumstances.

When looking out for a light at night, the fact is often forgotten that from aloft the range of vision is much increased. By noting a star immediately over the light a very correct bearing may be afterwards obtained from the compass.

The intrinsic power of a light should always be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

The power of a light can be estimated by remarking its candle power, as given in the Admiralty List of Lights, and in some cases by noting how much its visibility in clear weather falls short of the range due to the elevation at which it is placed. Thus, a light standing 200 feet above the sea, and only recorded as visible at 10 miles in clear weather, is manifestly of little brilliancy, as its elevation would permit it to be seen over 20 miles, if of any power. (*See* table in the Admiralty List of Lights.)

The distance from a light cannot be estimated either by its brilliancy or its dimness.

On first making a light from the bridge, by at once lowering the eye several feet and noting whether the light is made to dip it may be determined whether the vessel is in the circle of visibility corresponding with the usual height of the eye or unexpectedly nearer the light.

(11) Fog signals.—Sound is conveyed in a very capricious way through the atmosphere. The following points in regard to fog signals should be borne in mind:—

(*a*) Fog signals are heard at greatly varying distances.
(*b*) Under certain conditions of atmosphere, when an air fog signal is a combination of high and low tones one of the notes may be inaudible.
(*c*) There are occasionally areas around a fog signal in which it is wholly inaudible.
(*d*) A fog may exist a short distance from a station and not be observable from it, so that the signal may not be sounded.
(*e*) Some fog signals cannot be started at a moment's notice after signs of fog have been observed.

Mariners are therefore warned that fog signals cannot be implicitly relied upon, and that *the practice of sounding should never be neglected.* Particular attention should be given to placing "Look-out men" in positions in which the noises in the ship are least likely to interfere with the hearing of the sound of an air fog signal; as experience shows that, though such a signal may not be heard from the deck or bridge when the engines are moving, it may be heard when the ship is stopped, or from a quiet position. It may sometimes be heard from aloft though not on deck.

Great assistance may be obtained from radio beacons at many important lighthouses and light-vessels, but the attention of Mariners is called to the serious dangers which may arise from their misuse. No attempt should be made to approach such a position on a radio bearing, whilst relying only on hearing the sound fog signal in sufficient time to alter course to avoid danger. When the radio fog signal is transmitted from a light-vessel, it is essential in order to avoid collision, that the bearing from the light-vessel should not be kept constant.

(12) Tides.—In navigating coastal waters where the range of the tide is considerable, caution is always necessary. The tidal predictions for Standard ports in the Admiralty Tide Tables can generally be relied upon to give the times of high and low water to within a few minutes, and heights within a few tenths of a foot. Larger errors are to be expected in the predictions for places which are not Standard ports, computed from the data in Part II, but such predictions computed from the harmonic constants are always sufficiently accurate for the general requirements of navigation. For Standard ports the heights of the tide at times between high and low water may usually be found within narrow limits in accordance with the instructions in Parts I and III of the Tide Tables.

The datums of Admiralty charts depending on Admiralty surveys vary with the type of tide, but usually conform with the International agreement, that datum should be " a plane so low that the tide will but seldom fall below it." The datums used by different nations, however, differ very considerably and those of Admiralty charts depending on foreign surveys are always those used by the original surveyors, which vary from " lowest possible low water " to " mean low water " in tidal waters, and are usually mean sea level in non-tidal waters.

The datum used is always stated on large-scale Admiralty charts.

Caution.—Most datums are above the lowest level to which the tide may fall ; the charts therefore do not always show minimum depths.

(13) **Tidal streams.**—Where the tidal streams are semi-diurnal information regarding them is usually given, in a convenient part of the chart, in tabular form or by notes, special symbols being inserted at the positions to which the information refers. In certain cases, where the information available is incomplete, the streams are indicated by means of arrows.

There are many places where the tidal streams cannot be predicted by reference to the tide at a Standard port. Although no data for predicting the times at which they flow is given, their general direction is, in many cases, indicated by arrows on the charts. For a few of the straits and channels, where these conditions exist, tidal stream predictions are given in Admiralty Tide Tables.

Tidal streams, particularly if rotary, may vary considerably both in direction and rate ; predictions of the stream must therefore always be considered approximate.

The turn of the tidal stream is not usually coincident with the times of high and low water ; in fact, though in estuaries, harbour entrances, &c., the stream usually turns at about the times of high and low water, in open channels, and along open coasts generally, the turn usually occurs more nearly at half-tide. Predictions of the times of high and low water must therefore never be used as predictions of the times of slack water.

It should be remembered that, even where the general direction of the stream is parallel with the shore, an indraught is usually experienced when crossing the entrances to bays and inlets.

(14) **Fixing positions.**—For further information on this subject, *see* Admiralty Manual of Navigation.

When in sight of land, every opportunity should be taken of fixing the ship's position by terrestrial objects.

(*a*) *Simultaneous bearings or angles.*—The most usual method is by compass bearings of suitable objects, and it must be borne in mind that a fix by only two bearings is liable to error, either an absolute error in taking the bearings, or those made in applying the deviation or in laying the bearings off on the chart. For these reasons, a third or check bearing of some other object should, when possible, be taken, especially when near the shore or dangers. The coincidence of the resulting three lines will prevent any mistakes if the objects are suitably placed.

The position may also be fixed by observing horizontal sextant angles of well-defined suitably placed objects. These angles may be plotted on the chart with a station-pointer. Two conditions are, however, necessary to its successful employment ; first, that the objects be well chosen ; and, second, that the observer is skilful and rapid in his use of the sextant and station-pointer. For the former, reference can be made to the pamphlet on the use of the station-pointer, or to the Admiralty Manual of Navigation; the latter is only to be obtained by practice.

It will readily be seen that a sextant often offers advantages, as angles can be obtained from any position whence the objects are visible, and the fix is in no way dependent on the compass.

In many narrow waters also, where the objects may yet be at some distance, as in coral harbours or narrow passages among mud banks, navigation by sextant and station-pointer is invaluable, as a true position can only be obtained by its means. A small error in either taking or plotting a bearing under such circumstances may put the ship ashore.

In all cases where great accuracy of position is required, such as the fixing of a rock or shoal, or the addition to a chart of fresh soundings or new buildings, angles should invariably be used. In such cases angles should be taken of a number of objects, five being a good number, since this not only fixes the position beyond doubt, but also affords a useful check on the accuracy of the chart itself. When running a line of soundings it is only necessary to take a third angle every now and then, firstly to make certain that the more important soundings, as at the end of a line, are correctly placed, and secondly to check the general accuracy of the chart.

Sometimes when only one of the selected objects is visible from the compass, a compass bearing of it and a sextant angle to the other may be used to fix the position.

(*b*) *Simultaneous bearing and distance.*—Attention is also directed to the very useful and handy method of fixing by the bearing and distance of a suitable object.

Should the ship be supplied with ranging equipment, its use here is obvious, but without it a very good approximate distance of an object of known height may be obtained by observing its angle of elevation and obtaining its distance from Lecky's Offshore Distance Tables, which are supplied with all sets of charts. Full directions for the use of these Tables are given with them.

(*c*) *The running fix.*—If two position lines are obtained at different times the position of the ship may be found by transferring the first position line up to the time of taking the bearing for the second position line. The point of intersection of the second and the transferred position line is the ship's position at the time of the second observation.

The accuracy of this fix will depend on the accuracy of the estimated run (over the ground) between bearings and, therefore, it is essential to take great care that an accurate allowance is made for tidal stream, current, and leeway experienced by the ship during this interval.

The method of fixing by doubling the angle on the bow is useful when passing points of land, &c., in waters where there is either no tidal stream or current, or where this can be estimated with sufficient accuracy.

This method is as follows:—

Suppose that the angle between the ship's head and an object is measured, and found to be X°, and that the time of the observation is noted. Suppose also that the time is again taken when the angle between the ship's head and the object is 2X°. Then, if the course made good is the course steered, the distance of the ship from the object at the time the second bearing was taken is equal to the run (over the ground) in the interval. Hence the ship's position can at once be laid off as a bearing and distance from the object. In practice the angle X should not be less than about 25°.

The most usual form of this method, the so-called "four-point" bearing, gives a good fix for a departure, but does not ensure safety, as the point and any dangers that may lie off are abeam before the position is obtained.

The above fix is reliable when there is no tidal stream or current or when it runs directly with or against the course of the ship. When the stream or current runs across the course of the ship or when leeway is to be allowed for, this method should never be used and the ship's position should be obtained by plotting the two bearings as a running fix.

A table " Distance of an object by two bearings " is supplied with certain chart folios, and is also given in Inman's Tables, by which the ship's position at the second bearing can be found: any two bearings at a suitable angle to each other may be used, together with the run between them, but, again, this table should not be used when the vessel is subject to a cross tidal stream or leeway.

(*d*) *The danger angle.*—The use of the danger angle in passing outlying dangers with land behind them should also not be forgotten.

A vertical danger angle is useful when the danger lies off an object such as a lighthouse, the height of which is known; the angle being obtained from the aforesaid Lecky's Tables. If a horizontal danger angle between two objects is used, however, caution is necessary, as, should the objects not be correctly placed on the chart, the angle taken from it may not serve the purpose. This method should not, therefore, be employed when the survey is old or manifestly imperfect.

(*e*) *The astronomical position line.*—When fixing by astronomical observations, attention is drawn to the great utility of the position line. Even a single position line may at times give invaluable information, as the ship must be somewhere on this line, provided that the chronometer error is accurately known.

A sounding obtained at the same time may often serve to give an approximate position. Again, by steering along, or at a required distance parallel to, a single position line, a vessel may make her port or avoid a danger, although uncertain of her position.

A very accurate position may be obtained by observations of three or more stars at evening or morning twilight, or by the observation of a bright star at daybreak and another shortly afterwards of the sun when a few degrees (not less than 10°) above the horizon. The position lines obtained from the bodies observed should differ in azimuth by 30° or more.

Mariners are also reminded that, with modern tables for correcting the altitude, observations of the moon entail practically no more calculation than those of a planet. Moon sights are sometimes available when stars are obscured by light cloud, &c.; also, an excellent position may frequently be obtained by simultaneous observations of the sun and moon.

(*f*) *The radio position line.*—A number of radio systems of which the principal ones are M/F D/F, Radio Beacons, Consol Beacons, Loran, Gee and Decca, are now in general use from which position lines or fixes may be obtained.

The accuracy and range which may be obtained from these systems vary considerably; their great advantage over other methods lies in the fact that they can be employed under all weather and visibility conditions, though in some cases the results obtained will vary between day and night.

Special receiving equipment is generally required in order to make use of the radio signal, and some systems require special lattice charts or tables for plotting the position lines. Full details of these systems and their coverage areas are contained in Admiralty List of Radio Signals, Volume II.

The mariner should appreciate that with the position-fixing systems the accuracy of a fix will depend on three factors:—

(i) The distance of the observer from the transmitters.
(ii) The bearing of the observer from the base line joining the pair of stations which he is using.
(iii) The angle of intersection of the hyperbolic position lines.

It should be apparent from the inspection of any lattice chart that an inherent small equipment error, or a small personal error that may occur at the receiver, will cause a geographical error of varying amount according to the observer's position.

It is important to realise that accurate equipment is no guard against the vagaries of the propagation of radio waves. The beacons and systems operating on medium and low frequencies are liable to "night error" in areas where the ground and sky waves are received with equal strength; these areas will occur at ranges depending upon the particular frequency used by any beacon or system. Where the transmissions of two stations are synchronised to provide one signal reading and position line, "night error" will be a minimum along the normal to the base line joining the pair of stations, and a maximum towards the limits of their service sector.

Little is yet known about the effects of hills and discontinuities in the terrain (such as cliffs) on the speed of medium- and low-frequency radio waves.

At the other end of the radio spectrum the transmissions of systems operating on the very high frequencies are subject to distortion in abnormal atmospheric conditions.

(*g*) *Fixing by radar*.—Radar may also be of considerable assistance when navigating in coastal waters in low visibility or at night. It is essential, however, to appreciate the limitations of a radar set when interpreting the information obtained from it. It must be remembered that the radar horizon is only slightly farther than the visual horizon would be, in good visibility, for a height of eye equal to the height of the radar aerial. Hence no echoes will be received from a coastline lying below the radar horizon, while echoes may be received from high ground farther inland which will give a misleading impression of the range of the nearest land.

Depending on the width of its beam, the bearings from a radar set tend to be inaccurate. It is therefore preferable when fixing by radar to use ranges rather than bearings. It is then most important to consider carefully the identity of the object giving the echo, using the bearing as an indication, and the height of the object to determine whether it will appear on the radar presentation. Radar Range Nomograms are useful in deciding this, but a satisfactory result can be obtained by using "Distance to Sea Horizon Tables."

When two or more objects on the radar presentation have been selected and positively identified, a satisfactory fix can be obtained by striking arcs on the chart with the radar range of the selected objects. These arcs intercept at the ship's position. Best results will be obtained by using isolated objects such as detached lighthouses, rocky islets, and the extremities of long piers or jetties, but where no such objects are available a steep coastline with cliffs should be used. Flat or gently shelving coastlines, such as mud flats or sand dunes, should not be used since it is difficult to identify any portion of them on the radar presentation. Identification is assisted in some areas by fitting objects, such as buoys and beacons, with radar reflectors, causing them to return strong echoes. Attention is drawn to the symbols with which such objects are marked on Admiralty Charts, and which are given in the latest edition of Chart No. 5011, " Explanation of signs and abbreviations used on Admiralty Charts."

The difficulty of positive identification of objects is largely reduced if a Chart Comparison Unit is used in conjunction with the navigational radar. Fixes obtained with this equipment employ, in principle, an infinite number of ranges of the terrain in the vicinity of the ship, and in so doing a satisfactory fix will normally be assured.

In addition, radar beacons are available in some areas. Details of these and their use are given in the Admiralty List of Radio Signals, Volume II.

(15) **Observations for errors of the compass.**—No opportunity should be neglected for checking the error of the compass. When coasting, and a well-surveyed and fairly large-scale chart is available, an excellent method of observing the error is by taking the compass bearing of two suitable objects when in transit, and comparing this with the charted bearing ; there should be sufficient distance between the objects to provide a sensitive transit. When this method is not available the error should be obtained by azimuths of a heavenly body. Errors should be observed on any change of course on which the ship is steadied for a reasonable time, and at least twice a day when steering a steady course for long periods.

(16) **Change of variation of the compass.**—The gradual change in the variation must not be forgotten in laying down positions by bearing on charts. The magnetic compasses placed on the charts for the purpose of facilitating plotting become in time slightly in error, and in some cases, such as with small scales, or when the lines are long, the displacement of position from neglect of this change may be of importance. The compasses are re-engraved when the error amounts to a degree, but the chart plates cannot be corrected more frequently from the impossibility of making alterations often on one spot in a copper plate.

The geographical change in the variation is in some parts of the world sufficiently rapid to need consideration. For instance, in approaching Halifax from Newfoundland the variation changes 10° in less than 500 miles, and in the English channel about 5° in 400 miles. The Variation chart should be consulted on this head.

On certain general charts embracing large areas with considerable change of variation, true compasses are placed instead of magnetic compasses, the variation being shown by *isogonic lines* (curves of equal magnetic variation), in a similar manner to the Variation chart. One or two *isogonic lines* are also sometimes placed on charts, in addition to the magnetic compasses, in order to indicate the general direction of these curves, and thus facilitate the determination of the variation to be employed in portions of the chart not in immediate proximity to any one of the engraved compasses. Magnetic variation values shown on Admiralty charts are for the 1st July of the year mentioned.

(17) **Local magnetic disturbance of the compass on board ship.**—The term " local magnetic disturbance " has reference only to the effects on the compass of magnetic masses external to the ship in which it is placed. Observation shows that such disturbance of the

compass in a ship afloat is experienced only in a few places on the globe. Magnetic laws do not permit of the supposition that it is the visible land which causes such disturbance, because the effect of a magnetic force diminishes in such a rapid proportion as the distance from it increases that it would require a local centre of magnetic force of an amount absolutely unknown to affect a compass half a mile distant.

Such deflections of the compass are due to magnetic ores in the bed of the sea under the ship, and when the water is shallow, and the force strong, the compass may be temporarily deflected when passing over such a spot, but the area of disturbance will be small, unless there are many centres near together. Such areas are depicted by a special symbol on charts, and the cause of the magnetic disturbance is referred to as a Local Magnetic Anomaly.

They may also be due to wrecks lying on the bottom in moderate depths, but investigations have proved that, while deflections of unpredictable amount may be expected when very close to such wrecks, it is unlikely that deflections in excess of 7° will be experienced, nor should the disturbance be felt beyond a distance of 250 yards.

It is very desirable that whenever a ship passes over an area of local magnetic disturbance, the position should be fixed, and the facts reported as far as they can be ascertained.

(18) **Use of oil for modifying the effect of breaking waves.**—Many experiences of late years have shown that the utility of oil for this purpose is undoubted, and the application simple.

The following may serve for the guidance of seamen, whose attention is called to the fact that a very small quantity of oil, skilfully applied, may prevent much damage both to ships (especially the smaller classes) and to boats, by modifying the action of breaking seas.

The principal facts as to the use of oil are as follows:—

1. On free waves, i.e., waves in deep water, the effect is greatest.

2. In a surf, or waves breaking on a bar, where a mass of liquid is in actual motion in shallow water, the effect of the oil is uncertain, as nothing can prevent the larger waves from breaking under such circumstances; but even here it is of some service.

3. The heaviest and thickest oils are most effectual. Refined kerosene is of little use; crude petroleum is serviceable when nothing else is obtainable; but all animal and vegetable oils, such as waste oil from the engines, have great effect.

4. A small quantity of oil suffices, if applied in such a manner as to spread to windward.

5. It is useful in a ship or boat, both when running, or lying to, or in wearing.

6. No experiences are related of its use when hoisting a boat up in a sea-way at sea, but it is highly probable that much time and injury to the boat would be saved by its application on such occasions.

At anchor, when the sea is sufficient to render it difficult to hoist up or in boats, oil bags from forward or from the swinging booms have been found to render the sea alongside comparatively smooth.

7. In cold water, the oil, being thickened by the lower temperature, and not being able to spread freely, will have its effect much reduced. This will vary with the description of oil used.

8. The best method of application in a ship at sea appears to be: hanging over the side, in such a manner as to be in the water, small canvas bags, capable of holding from one to two gallons of oil, such bags being pricked with a sail needle to facilitate leakage of the oil.

The position of these bags should vary with the circumstances.

Running before the wind they should be hung on either bow and allowed to tow in the water.

With the wind on the quarter the effect seems to be less than in any other position, as the oil goes astern while the waves come up on the quarter.

Lying to, the weather bow and another position farther aft seem the best places from which to hang the bags, with a sufficient length of line to permit them to draw to windward, while the ship drifts.

9. Crossing a bar with a flood tide, oil poured overboard and allowed to float in ahead of the boat, which would follow with a bag towing astern, would appear to be the best plan. As before remarked, under these circumstances the effect cannot be so much trusted.

On a bar with the ebb tide it would seem to be useless to try oil for the purpose of entering.

10. For boarding a wreck, it is recommended to pour oil overboard to windward of her before going alongside. The effect in this case must greatly depend upon the set of the current, and the depth of the water.

11. For a boat riding in bad weather from a sea anchor, it is recommended to fasten the bag to an endless line rove through a block on the sea anchor, by which means the oil is diffused well ahead of the boat, and the bag can be readily hauled on board for refilling if necessary.

12. Towing a vessel in a heavy sea, oil is of the greatest service, and may prevent parting the hawser. Distribute from the towing vessel forward and on both sides; if used only aft the tow alone gets the benefit.

(19) **Mirage and abnormal refraction.**—An unusual lapse rate of temperature (and therefore density as well) with height immediately above the sea (or land) surface produces a distortion in the appearance of objects near the horizon; such a phenomenon is known as mirage.

When the surface is relatively cold (and the wind very light) so that the density of the air decreases rapidly for a short distance above the surface, light rays from objects low down near the horizon are bent down, the same way in fact as are usually the rays of the sun when entering the earth's atmosphere at a low altitude. The effect is to render visible objects that are normally below the horizon, e.g., lights may be " raised " at night at much greater distances than one would ordinarily expect. This phenomenon is known as " looming."

A further occasional effect produced when the air is appreciably warmer than the sea, is " superior mirage " in which an inverted image is seen over the real object; sometimes an erect image is seen immediately above and touching the inverted one. The object and its images in this instance are well defined in contrast to the shimmering object and image of the inferior mirage. Superior mirage is most often experienced in high latitudes and wherever the sea surface temperature is abnormally low.

" Inferior mirage," the effect of which is to decrease the distance at which objects are visible in a horizontal direction, is due to a rapid increase of density with height close to the surface such as occurs when air of comparatively low temperature blows over a warmer sea, or over a tarred road or desert when a hot sun is beating down on it. In either event light rays are bent up when approaching the surface where the density of the air is much less than above. The coastline, and at times a ship or island, may appear to be floating in air above a shimmering horizon, possibly with, in the former instance, her hull either invisible or with an inverted image underneath. Inferior mirage is comparatively uncommon at sea and is more likely to be observed along a coastline than well out to sea.

When mirage is evident caution must be used in taking sights with a sextant, for abnormal refraction must necessarily be present also. With inferior mirage better, but not normal, results will usually be obtained by ascending as high as possible in the ship; with superior mirage the height of eye should be as low as possible. It is, however, advisable, whenever abnormal refraction is suspected, to measure the elevation of the celestial body above the back as well as the front horizon as explained in navigational text-books.

(20) Aurora.—The most common form of aurora is an arc system, single or multiple, narrow and well defined, or broad and diffuse, and centred on the magnetic meridian.

The most usual colour is pale whitish green when the auroral activity is weak and diffuse: but when the aurora arises high towards the zenith in the form of rays, rayed curtains and draperies with much rapid movement of the constituent rays, the colours sometimes become much stronger and more vivid, and include bright green, red and violet. When the curtains forming the aurora converge to form a corona, which may rotate very rapidly about the point of convergence, the displays may become very complex, filling practically the whole sky, and extending far to the equatorial side of the zenith with much rapid movement and change of colour from instant to instant.

Though the most usual duration of auroral displays in these high latitudes is several hours, they not infrequently last throughout the whole night from dusk to dawn. In such long displays the really intense and violently active periods with vivid strong colours are generally confined to spasms of 15–30 minutes, with the intervening periods filled with diffuse glows or quiet arc systems.

The absolute intensity of the light of the aurora is seldom great, and the brighter stars usually glimmer through it. In the most vivid and intense displays, the light may equal, but rarely surpasses, that of the full moon in a cloudless sky. It may give enough light to read by. On such occasions the aurora may be visible to some extent in partial twilight.

Though in high latitudes aurora occurs any time in the dark hours it is probably most frequent in the late evening hours from 9 p.m. till midnight or just after; it is more frequent in the equinoctial months than at other times and has a well-defined 11-year period of activity following the cycle of solar activity. A maximum of activity occurred in 1948, and the interval from maximum to minimum activity usually occupies a period of about 6 to 7 years. In high latitudes this cycle of activity is reflected more in the intensity and vividness of the displays than in their frequency of occurrence. Though really outstanding displays tend to occur around the years of maximum activity they may occur at any time of the cycle, except perhaps near the absolute minimum.

In addition to this 11-year cycle of activity active periods tend to recur at intervals of 27 days, *see* Magnetic Storms.

Northern hemisphere.—Aurora Borealis occurs most frequently along a zone which forms an approximate oval, of average radius 23°, with centre in the extreme north-west of Greenland. This zone of maximum frequency crosses Hudson Bay and the Labrador coast in about lat. 58° N. It runs south of Cape Farewell and along the south coast of Iceland. It lies just north of North Cape, touches the extreme north of Novaya Zemlya, skirts Cape Chelyuskin and then eastward just north of Wrangel Island into the north of Alaska. Along this zone aurora of some kind can probably be seen every suitable night when the sky is clear; 250 miles outside this maximum zone to the southward the auroral frequency decreases sharply to about 70–100 nights a year on the average, and to 20–25 nights 500 miles south of the maximum zone. Inside the maximum zone the geographical distribution of frequency is not so well established but it probably falls off more gradually than it does outside.

On the zone of maximum frequency itself aurora appears as frequently to the south of the zenith as to the north, but with increasing distance outside the zone the appearances concentrate more into the northern sky; the reverse is true inside the zone.

Southern hemisphere.—The frequency and distribution of Aurora Australis is not fully known. It is probable that it is more frequently seen at sea between about long. 50° E. and 175° W. than in other longitudes. Very fine displays have occasionally been seen in Australasia and on passages across the Southern Ocean. There is nevertheless a general impression that aurora is less frequent in the southern than in the northern hemisphere. This is probably to be accounted for by the fact that, apart from whaling and exploring expeditions, ships' tracks in general do not extend to such high latitudes as in the northern hemisphere.

The zone of maximum auroral frequency is roughly annular and is near the circumference of a circle of radius about 1,080 miles, centred in about lat. 75° S., long. 129° E. The frequency falls off both outside and inside this zone. A large part of the zone is within the continent of Antarctica.

(21) Magnetic storms.—Magnetic storms vary in intensity and frequency with the sunspot cycle, similarly to aurorae. An intense magnetic storm is always accompanied by a bright and active aurora. The deeply coloured aurorae, showing more pronounced red and green, and sometimes also blue and violet, tints, are invariably connected with magnetic storms of considerable or great intensity. Such a storm will produce simultaneous aurora in both hemispheres. In the greatest storms aurorae in some form may be visible down to about 20° north latitude in certain parts of the oceans, especially between the meridians of 30° W. and 140° W. Magnetic storms vary greatly in duration from a few minutes to several days; they are generally more intense during the hours of darkness. Long-continued storms usually show great fluctuations with periods of complete or partial quiescence. Similarly the associated aurora fluctuates between active and quiescent forms.

The origin of magnetic storms and aurorae is not yet fully understood, but they are intimately connected with the state of a local area of the sun. As the same part of the sun is again presented to the earth after an interval of about 27 days, a magnetic storm and aurora may recur at this time, usually in less intense form.

A ship's compass may tend to deviate during the progress of a considerable magnetic storm. In more intense storms the compass needle may oscillate 1° or more either side of its normal position. Such oscillation may persist for as long as 10 or 20 minutes before dying out. Further oscillation may occur after a period of quiescence. Deviations of 2° or more are rare, but during the great magnetic storm and aurora of January 25th, 1938, one of 4° to the eastward was observed off the Portuguese coast. During a severe magnetic storm the compass may be deflected continually in one direction to the extent of about half a degree for some hours. When bright aurora is seen, especially if it is of the more deeply coloured and rapidly moving kind, and particularly when it is observed in low latitudes, the possibility of deflections of the compass should always be borne in mind.

During a considerable magnetic storm freak wireless reception may occur on certain waves and short-wave transmission may fade to complete silence. Beam radio communication, especially in a west-east or east-west direction, may be interrupted. Such conditions may last in some degree over a period of several days, at times when the sun is unusually active. Short-wave fading also occurs occasionally from a different form of solar disturbance known as a " bright eruption," when this is very intense. On the average such fading begins about 7 minutes after occurrence of the bright eruption and may last 5 or 10 minutes, gradually returning to normal within a period of 40 to 45 minutes. These fadings are confined to the daylight hemisphere of the earth, while the magnetic storm fadings may occur by day or by night.

GENERAL METEOROLOGY.

(All the following articles do not apply to every Pilot, but articles applicable to this Pilot will be referred to in the Climate and Weather Section in Chapter I.)

(1) **Lows.**—A low, or depression, appears on a synoptic chart as a series of isobars roughly circular or oval in shape, surrounding an area of low pressure. It is a main feature of the weather at sea in middle latitudes where it is responsible for most of the occasions of strong winds and unsettled weather, though not all depressions are accompanied by strong winds.

Lows vary very much in size and depth ; one may be only a hundred miles in diameter and another over two thousand miles ; some are deeper than others, a deep low being one in which the pressure is very much lower near the centre than on the outside whereas, on the other hand, a shallow depression is one where the pressure, although low near the centre, is not very much lower than in the surrounding districts.

Note.—The bracketed equivalents hereunder refer to the Southern Hemisphere.

In the northern (southern) hemisphere the winds blow round an area of low pressure in an anti-clockwise (clockwise) direction ; there is also a slight inclination across the isobars towards the lower pressure. Thus the well-known rule for the northern (southern) hemisphere is that when an observer faces the wind the direction of the lowest pressure is from 8 to 12 points to his right (left). The strength of the wind is in all instances closely related to the steepness of the barometric gradient or distance apart of the isobars ; the closer the isobars the stronger the wind.

Lows may move in almost any direction, though most often towards north-east (south-east) or east, at a speed of anything between 10 and 40 knots, though occasionally as much as 60, during the middle and most active stage of their existence ; they slow down when filling up (*see* " occlusion " below). The life of a low is in the region of 4 to 6 days.

There are usually one or more fronts, probably radiating from the centre, in the area covered by a low; each front on a synoptic chart represents a belt of relatively bad weather, accompanied by a veer (backing) of wind, which marks the change from the weather characteristic of one air mass to that of another. During the first two or three days of its life a low has a warm and a cold front, the area between the two being known as a warm sector because the air has come from a warmer locality than that which is outside the sector (*see* Fig. 1*a*). Warm air is lighter than cold air and it rises over the cold air ahead of the warm front as shown in Fig. 1*b*; this causes condensation of the water vapour in the warm air, forming at first cloud and later drizzle or continuous steady rain. The cloud spreads out ahead of the warm front, and the highest cloud, cirrus or mares' tails, is often about 500 miles ahead. At the rear boundary of the warm sector, known as the "cold front," the cold air is pushing under the warm air forcing the latter to ascend rapidly; this process is sometimes violent enough to produce squalls. The rapid ascent of the warm air causes the moisture to condense in the form of cumulo-nimbus clouds (shower clouds), from which heavy showers may fall. The cold front gradually overtakes the warm front so that the warm sector is eventually lifted up from the earth's surface. When this has occurred the low is said to be occluded, and the warm and cold fronts have merged into the third type of front known as an "occlusion" (*see* Figs. 2*a* and *b*). When a low has become occluded, it usually decreases in intensity and rate of travel, and gradually fills up. On the other hand, a low which has a marked warm sector is likely to be deepening, the winds associated with it may increase in force and its rate of travel may increase. Lows are usually travelling in a direction approximately parallel to the isobars (and in the direction of the wind) in the warm sector.

The approach of a low is indicated by a falling barometer. In the northern (southern) hemisphere, if the low is approaching from westward and passing northward (southward) of the ship, clouds appear on the western horizon, the wind shifts to a south-westerly (north-westerly) or southerly (northerly) direction and freshens, the cloud layer gradually lowers, and finally drizzle, rain or snow begins. If the low is not occluded, after a period of continuous rain or snow there is a veer (backing) of wind at the warm front, a rise of temperature and diminution or cessation of rain (or snow) in the warm sector, the visibility being usually moderate and the sky overcast with low cloud. The passage of the cold front is marked by the approach from westward of a thick bank of cloud (which however cannot often be seen because of the customary low overcast sky in the warm sector), a further veer (backing) of wind to west or north-west (south-west), sometimes with a sudden squall, rising pressure, a fall of temperature, squally showers of rain, hail or snow, and improved visibility (except during showers). The squally showery weather with a further veer (backing) of wind and drop in temperature may recur while the low recedes owing to the passage of another cold front or occlusion. If the low is occluded, the occlusion is preceded by the cloud of the warm front; there may be a period of continuous rain mainly in front of and at the line of occlusion, or a shorter period of heavy rain mainly behind the occlusion, according as the air in front of the occlusion is colder or warmer than that behind it. There may be a sudden veer (backing) of wind at the occlusion.

Often another low follows 12 to 24 hours later, in which event the barometer begins to fall again and the wind backs towards south-west (north-west), or even south (north).

If a low travelling eastward or north-eastward (south-eastward) is passing southward (northward) of the ship, the winds in front of it are easterly and they back (veer) through north-east (south-east) to north (south) or north-west (south-west); changes of direction are not likely to be so sudden as on the southern (northern) side of the low. In the rain area there is often a long period of continuous rain and unpleasant thick weather with low cloud. In winter in the colder regions the weather is cold and raw and precipitation is often in the form of snow.

Near the region of lowest pressure, lulls are sometimes experienced, but sudden changes are likely, and in a deep low the wind may increase in strength very rapidly, perhaps to gale force as the barometer begins to rise.

Sometimes in the air circulation of a large low, usually on the equatorial side and often on a cold front, a secondary depression develops, travelling in the same direction as the primary but usually more rapidly. The secondary often deepens while the original low decreases in intensity. In the region between the primary and the secondary depressions, the winds are not as a rule strong; but on the further side of the secondary, usually the southern (northern) side, winds are likely to be strong and they may reach gale force. Thus the development of a secondary may cause gales at a greater distance from the primary than anticipated, while there may be only light winds where gales were expected.

The above is a brief general description of lows and the associated weather in temperate or middle latitudes of the northern (southern) hemisphere. It must be emphasised, however, that individual lows in different localities differ considerably from one another, according to the characteristics (especially the temperature and humidity) of the air currents of which they are composed, and the nature of the surface over which they are travelling.

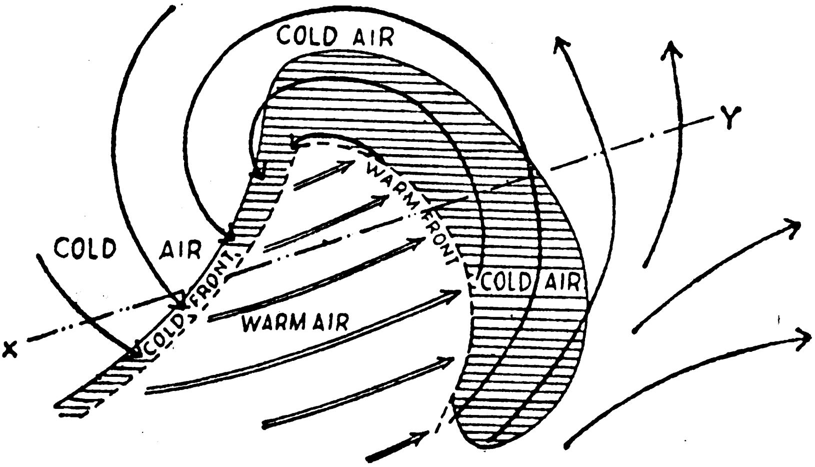
(2) **Tropical revolving storms.**—*Practical rules for avoiding them.*—These storms are so named because the wind blows round an area in which the lowest pressure is at the centre. The direction of rotation is anti-clockwise in the northern hemisphere and clockwise in the southern hemisphere. The wind does not revolve round the centre of low pressure in concentric circles but has a spiral movement inwards, towards the centre of the storm field.

A tropical storm is not so extensive as the depression of higher latitudes but, within 75 miles or so of the centre, the wind is often far more violent, and the high and confused seas near the centre may cause considerable damage to large and well-found ships, while small vessels (for example, destroyers) have foundered. The danger is still greater when ships are caught in restricted waters without adequate room to manœuvre. Within 5 to 10 miles of the centre the wind is light or moderate and variable, the sky is clear or partially so, and there is a heavy, sometimes mountainous, confused swell; this area is known as the "eye" of the storm. After passing through the relatively windless centre of the storm the wind will suddenly, and with great violence, commence to blow from a direction almost opposite to that experienced on the other side of the windless centre. Due to torrential rain and sheets of almost continuous spray, visibility near the storm centre (but outside the "eye") is almost nil.

Every ship navigating in an area subject to tropical storms during

NORTHERN HEMISPHERE.

Fig. 1a.



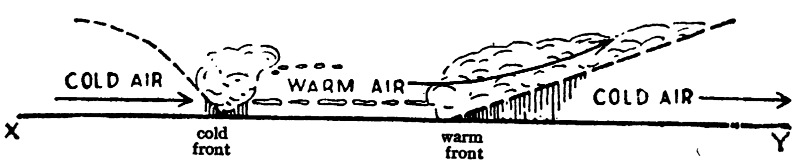
Plan of a developed depression.

The double lines show the flow of the warm air, and the single lines the flow of the cold air.

The shading shows the areas where rain (or snow) is most probable.

Width of rain belt ahead of warm front is generally between 100 and 200 miles.

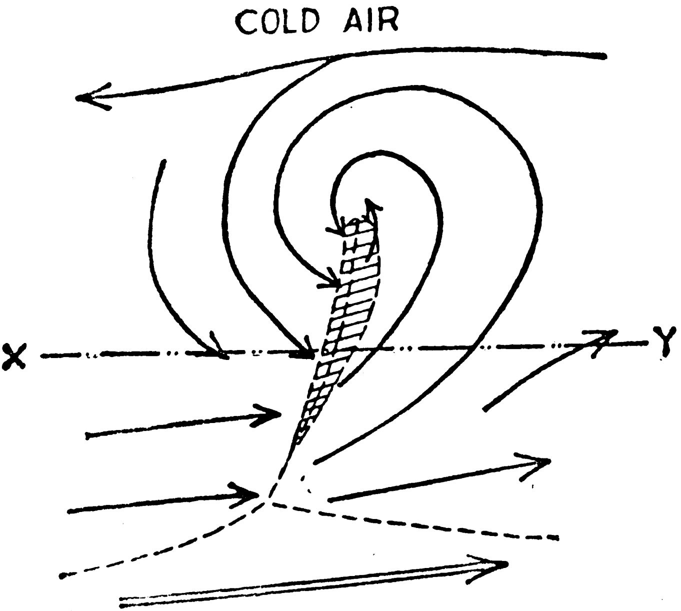
Fig. 1b.



Vertical section of the depression along the line XY.

[*See over page.*

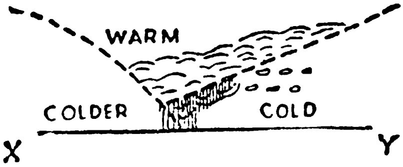
Fig. 2a.



Plan of an occluded depression.

The shading shows the region where rain (or snow) may be expected near the occlusion.

Fig 2b.

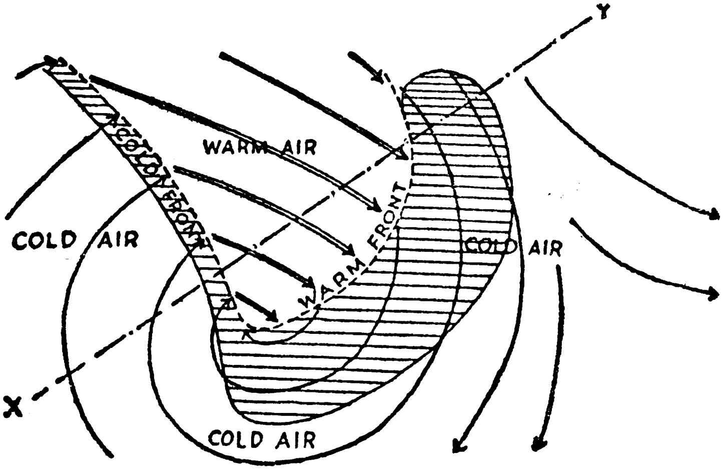


Vertical section of an occlusion of the cold front type.

The air in front of the occlusion is warmer than the air behind it.

SOUTHERN HEMISPHERE.

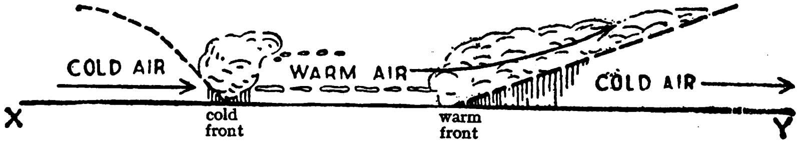
Fig. 1a.



Plan of a developed depression.

The double lines show the flow of the warm air, and the single lines the flow of the cold air.
The shading shows the area where rain (or snow) is most probable.
Width of rain belt ahead of warm front is generally between 100 and 200 miles.

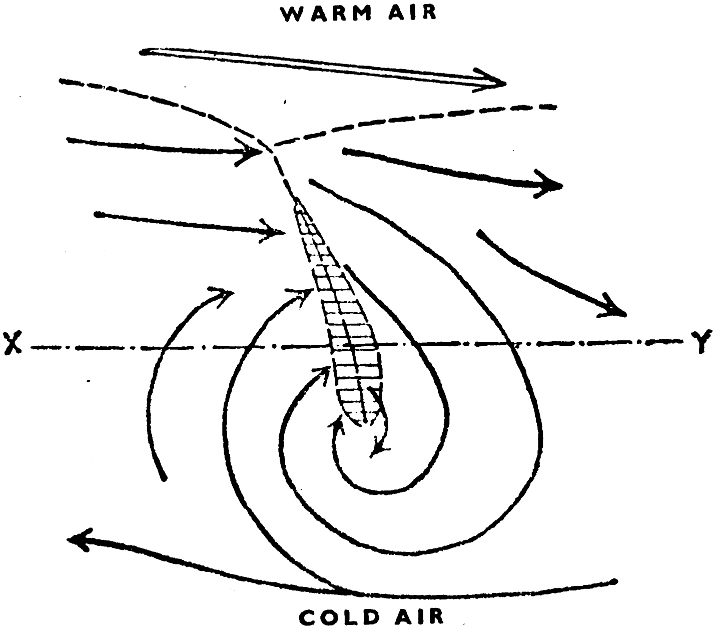
Fig. 1b.



Vertical section of the depression along the line XY.

[See over page.

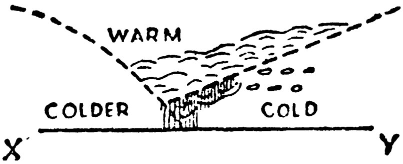
Fig. 2a.



Plan of an occluded depression.

The shading shows where rain (or snow) may be expected near the occlusion.

Fig. 2b.



Vertical section of an occlusion of the cold front type.

The air in front of the occlusion is warmer than the air behind it.

the season of their occurrence should be constantly on the alert for any sign of their approach, so that steps can be taken to avoid the danger zone while there is still time and sea-room.

Localities, season, and average frequency.—Tropical storms occur for the most part on the western side of the oceans, though they are also experienced in the Bay of Bengal, off the north-west coast of Australia, and off the west coast of Central America. They are unknown in the South Atlantic. They are given various names according to the part of the World in which they occur.

Western North Atlantic	–hurricanes
Eastern North Pacific	
South Pacific	
Western North Pacific	–typhoons
Indian Ocean	–cyclones
Bay of Bengal	
Arabian Sea	
North-west Australia	–willy-willies

They are most frequent during the late summer and early autumn of their hemisphere; they are comparatively rare in the southern hemisphere from mid-May to November, and in the northern hemisphere from mid-November to mid-June. In the Arabian Sea, however, storms are most likely to occur at the change of the monsoon, i.e., October–November, and May–June, though they average only one or two a year. Out-of-season storms occur from time to time, particularly in the western North Pacific where no month is entirely safe, and in the Indian Ocean where one is reported south of the Equator perhaps once in two years outside the usual season. The following table shows approximately the average number of severe tropical storms recorded per annum, from statistics taken over several years for the various areas:—

West Indies	5
Western North Pacific	25
„ South Pacific	3
Southern Indian Ocean	6
Bay of Bengal	2
Arabian Sea	1
Eastern North Pacific	3
West Coast of Australia	1

Variations in any one year amounting to 50% above or below the average are not unusual. Some of the figures quoted are probably an underestimate since in the less-frequented parts of the world many storms must escape detection.

Origin, movement and extent.—Tropical storms originate as a general rule in the doldrums, between the parallels of 7° and 15° of latitude; those which affect the western part of the Pacific, South Indian and North Atlantic Oceans are first reported in the western third of those oceans, though there are exceptions such as in the North Atlantic during August and September where an occasional storm is known to begin near the Cape Verde islands. In the northern hemisphere they move off in a direction between 275° and 350°, though most often within 30° of due west. When in a latitude of 25° or so they usually recurve away from the equator and, by the time they have reached the 30th parallel, the track (or path as it is more usually called) is north-easterly. In the southern hemisphere they move off in a WSW.

to SSW. direction (usually the former), recurve at about 15° to 20° S., and thereafter adopt a south-easterly path. In either hemisphere many storms do not recurve but continue in a west-north-westerly (or west-south-westerly) direction until they reach the mainland where they quickly die.

The speed of advance of these storms is usually about 10 knots in their early stages, increasing a little with latitude ; it seldom exceeds 15 knots before recurving, but after recurving 20 to 25 knots is usual though speeds of 40 knots or even more have been known.

Occasionally storms move erratically, the path turning towards the equator, or adopting an easterly component in a low latitude, or even making a complete loop, but on these occasions their speed of advance is low, usually less than 10 knots, while the unusual path is being followed.

The extent of the storm area varies considerably with individual storms but, generally speaking, winds of force 7 or more are improbable at more than 200 miles (especially on the equatorial side of the storm area) and force 8 is unlikely to be exceeded at more than 100 miles, from the storm centre, if in a latitude of less than 20°. Thereafter the radius increases with latitude so that these distances are nearly doubled on reaching the 35th parallel, but the intensity diminishes near the centre. Hurricane force winds are likely within 75 miles of the storm centre in the tropics, and gusts exceeding 150 knots have been reported in a few instances within 50 miles or so (except in the eye of the storm). The aim of the mariner should therefore be to remain as far as possible from the centre of the storm system.

Warning of existence or approach.—In most instances, warning of the position, intensity and probable movement of a storm is given by radio at frequent intervals by meteorological authorities ashore. (*See* Admiralty List of Radio Signals, Volume III.) Sometimes, however, there is insufficient evidence available for an accurate warning or even a general warning to be given and ships must then be guided by their own observations. Of the following indications of the proximity of a tropical storm, the first is by far the most reliable within 20° or so of the equator ; it should be borne in mind, however, that very little warning may be expected of the approach of an intense storm of unusually small diameter.

(*a*) If the corrected barometer reading is 3 mb. or more below the mean for the time of year, as shown in a climatic atlas or on the appropriate chartlets in the meteorological text of this Pilot, suspicion should be aroused and action taken to meet any development, such as raising steam in any available additional boilers, &c. It should be noted, however, that the barometer reading must be corrected not only for height, latitude, temperature and index error (if mercurial), or for height and index error if aneroid, but also for diurnal variation, the amount of which is given for each hour of the day in the Air Ministry climatic atlases and in the meteorological text of this Pilot. If the reading thus corrected is 5 mb. or more below normal, it is time to take avoiding action for there can be little doubt that a tropical storm is in the vicinity. According to an analysis of observations in the Western Pacific the centre cf the storm is then probably not more than 200 miles away. At this distance, at any rate in the China Sea vicinity, the wind has usually increased to about force 6.

When proceeding through an area liable to be visited by these storms it is desirable to take hourly readings of the barometer.

(*b*) An appreciable change in the direction and/or strength of the wind.

(*c*) A swell is sometimes evident, proceeding from a direction that approximates to the bearing of the centre. If ahead of the storm this indication may be apparent before the barometer begins to fall.

(*d*) Extensive cirrus cloud followed, as the storm becomes closer, by much alto-stratus cloud and subsequently fracto-cumulus or "scud."

(*e*) In addition there is the warning that can be given by Radar. The existence of moderate or heavy rain can usually, under favourable meteorological conditions, be detected at the extreme range of centrimetric radar, such as is normally used for navigational purposes afloat, depending on the vertical extent of the rainfall. Subrefraction might decrease and superrefraction increase this range as with any other target. Although moderate or heavy rain does not fall symmetrically all round a storm, it is continuous for at least 50 miles in a broad sector extending from the " eye " of the storm where there is a circular area of relatively light winds and clear or partially clear sky. By the time radar evidence of the exact position of the storm is available, the ship will probably be already in fairly high seas and experiencing winds of force 9 or 10. There should still be time, however, for her to avoid the centre of the storm.

Note.—In accordance with Article 35 of the International Convention for Safety of Life at sea it is the duty of every ship who suspects the presence or formation of a tropical revolving storm immediately to inform other vessels and shore authorities with all the means at her disposal. Weather reports should be made by radio at frequent intervals giving as much information as possible, especially corrected (*not* for diurnal variation as in (*a*) above) barometer readings. If barometer readings are uncorrected this fact should be stated in the signal.

Information required by the seaman before deciding upon action to be taken.—To decide on the best course of action if a storm is suspected to be in the vicinity, the mariner requires to know :—

(*a*) the bearing of the centre of the storm ;
(*b*) the semicircle in which the ship is situated ;
(*c*) the path of the storm.

If an observer faces the wind, the centre of the storm will be from 9 to 11 points on his right-hand side in the northern hemisphere when the storm is about 200 miles away, i.e., when the barometer has fallen about 5 millibars and the wind has increased to force 6 or thereabouts ; as a rule the nearer one is to the centre the more nearly does the angular displacement of the wind approach 8 points. A further check on the bearing of the centre may often be obtained by noting the direction from which the swell is coming. The swell travels approximately directly outward from the storm centre.

The semicircle in which the ship is situated can be determined by taking two such bearings with an interval of from two to three hours between observations, provided that allowance is made for the ship's movement. It can be assumed that the storm is not travelling towards the equator ; and, if in a lower latitude than 20°, its path is most unlikely to have an easterly component ; and, on the rare occasions when neither of these statements applies, the storm is moving very slowly. (Exceptions to this are most likely in the South Pacific, where occasional storms often move off on a course almost due south developing an easterly component at a latitude of about 15°, and in the western

North Pacific where some of the out-of-season storms may recurve at an early stage.)

In a moving ship associated with a storm progressing at an unknown rate, it is very difficult to estimate from an apparent shift of wind the direction and speed of the storm's motion relative to the ship. The surest method of ascertaining the true shift of wind and thereby finding out in which semicircle the vessel is situated, *is to stop the ship during the period between the two bearings.* If in either hemisphere, these observations show that the wind is veering, the ship is in the right-hand semicircle; if the wind is backing she is in the left-hand semicircle; and if the wind remains steady in direction then the vessel is in the direct path of the storm, which is the most dangerous place of all.

The diagram headed "Typical Paths of Tropical Storms" (at the end of this article) illustrates the terms "dangerous semicircle" and "navigable semicircle." The former lies on the side of the path towards the usual direction of recurvature, i.e., the right-hand semicircle in the northern and the left-hand semicircle in the southern hemisphere. It is so called because a sailing or low-powered vessel caught in it may be blown towards the path along which the storm will pass, or the storm may recurve and the centre pass over her. The navigable semicircle is that which lies on the other side of the path. A ship situated within this semicircle will tend to be blown away from the storm centre, and the recurvature of the storm will increase her distance from the centre.

Practical rules for avoiding tropical storms.—In whatever situation a ship may find herself, the matter of vital importance is to avoid passing within 50 miles or so of the centre of the storm; it is preferable to keep outside a radius of 200 miles or more, because at this distance the wind does not often exceed force 7 (and is generally not more than force 6), and freedom of manœuvre is maintained. If a ship has at least 20 knots at her disposal, and shapes a course that will take her most rapidly away from the storm before the wind has increased above the point at which her movement becomes restricted, it is seldom that she will come to any harm.

Sometimes a tropical storm moves so slowly that a vessel, if ahead of it, can easily outpace it or, if astern of it, can overtake it. Since, however, she is unlikely to feel seriously the effects of a storm so long as the barometer does not fall more than 5 mb. (corrected for diurnal variation) below the normal, it is recommended that frequent readings should be made if the presence of a storm in the vicinity is suspected or known, and that the vessel should continue on her course until the barometer has fallen 5 mb., or the wind has increased to force 6 when the barometer has fallen at least 3 mb. If and when either of these events occurs, she should act as recommended in the following paragraphs, until the barometer has risen above the limit just given, and the wind has decreased below force 6. Should it be certain, however, that the vessel is behind the storm, or in the navigable semicircle, it will evidently be sufficient to alter course away from the centre.

In the northern hemisphere.—(*a*) If the wind is veering, the ship must be in the dangerous semicircle. A steam or other power-driven vessel should proceed with all available speed with the wind 1 to 4 points (depending upon her speed) on the starboard bow, and should subsequently haul round to starboard as the wind veers, thereby tracing a course relative to the storm as shown by the pecked line in the diagram. If a steamer has insufficient room to make much headway when in the dangerous semicircle she should heave to in the most comfortable position relative to the wind, preferably with the wind on her starboard bow so that she is heading away from the centre of the storm.

(*b*) If the wind remains steady in direction, or if it backs, so that the ship seems to be nearly in the path (it is sometimes difficult to determine satisfactorily if indeed the ship is nearly in the path, particularly if in the dangerous semicircle, because the wind does not always behave according to rule) or in the navigable semicircle respectively, a steam vessel should bring the wind well on the starboard quarter and proceed with all available speed, subsequently altering course to port as the wind backs, thus tracing a course relative to the storm as shown by the pecked line in the diagram.

In the southern hemisphere.—(*a*) If the wind is backing, the ship must be in the dangerous semicircle. A steam or other power-driven vessel should proceed with all available speed with the wind 1 to 4 points (depending upon her speed) on the port bow, and should subsequently haul round to port as the wind backs, thereby tracing a course relative to the storm, as shown by the pecked line in the diagram. If a steamer has insufficient room to make such headway she should heave-to in the most comfortable position relative to the wind, preferably with the wind on her port bow so that she is heading away from the centre of the storm.

(*b*) If the wind remains steady in direction, or if it veers, so that the ship seems to be nearly in the path (it is sometimes difficult to determine satisfactorily if indeed the ship is nearly in the path, particularly if in the dangerous semicircle, because the wind does not always behave according to rule) or in the navigable semicircle respectively, a steam vessel should bring the wind well on the port quarter and proceed with all available speed, subsequently altering course to starboard as the wind veers, thus tracing a course relative to the storm as shown by the pecked line in the diagram.

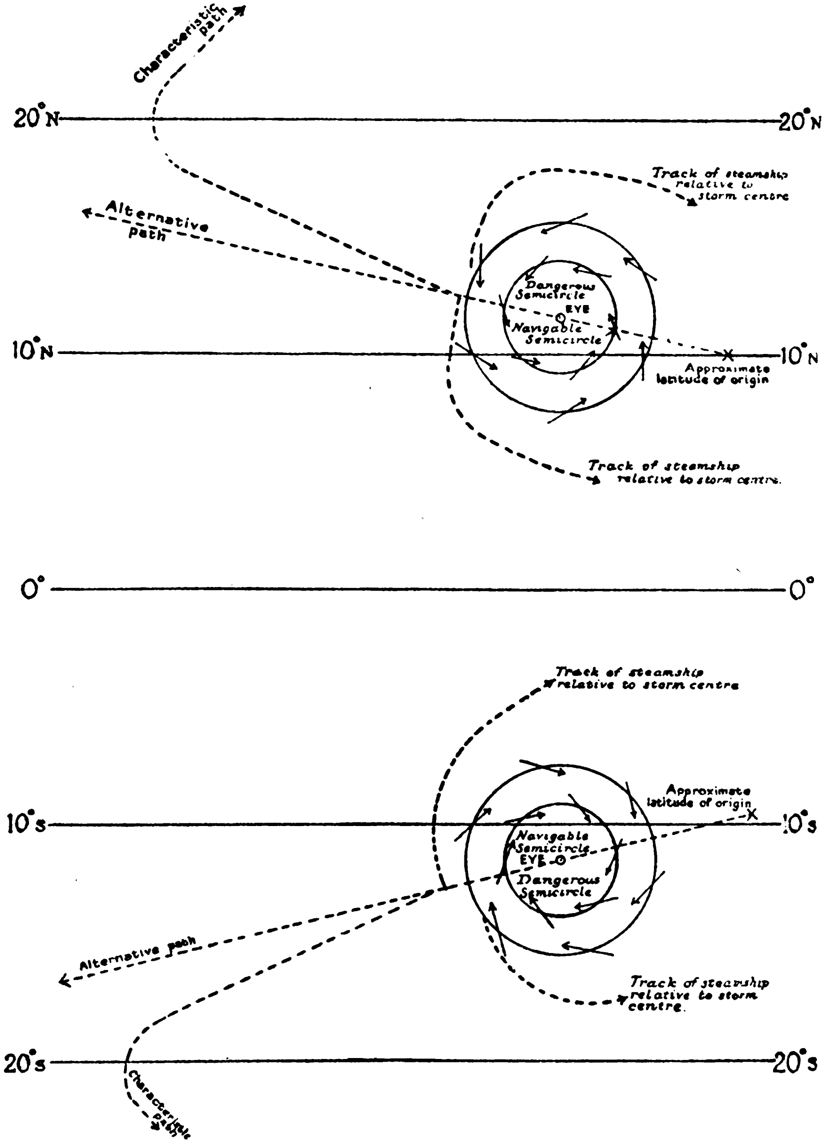
If there is insufficient room to run when in the navigable semicircle, and it is not practicable to seek a safe and effective shelter before the storm begins to be felt, a vessel should heave-to in the most comfortable position relative to the wind and sea, bearing in mind the proximity of land.

If a ship finds that she is in the direct path of the storm and has no room to run into the navigable semicircle as directed above, it should be considered, bearing in mind possible recurvature, whether she should endeavour to make her way into the " dangerous " semicircle (where she may at least be better off than remaining in the direct path of the storm) and continue to steam to windward as fast as she can so as to get as far as possible from the centre.

If in harbour, or at anchor, a seaman should be just as careful as at sea in watching the shifting of the wind and estimating the movement of the storm relative to himself, so that he may consider shifting his berth with advantage or otherwise act according to circumstances. It is usually preferable, however, to put to sea if this can be done in sufficient time to avoid the worst of the storm. Riding out a tropical storm, the centre of which passes within 50 miles or so, in a harbour or anchorage, even if some shelter is offered, is an extremely unpleasant and hazardous experience, especially if there are other ships in company. Even if berthed alongside, or with special moorings and long bridles in use, a ship cannot feel entirely secure.

Discretion must, of course, be used. In the case of a low-powered or small vessel with, for example, insufficient warning to enable her to

TYPICAL PATHS OF TROPICAL STORMS


Characteristic path
20°N
20°N
Track of steamship relative to storm centre
Alternative path
Dangerous Semicircle
EYE
Navigable Semicircle
10°N
10°N
Approximate latitude of origin
Track of steamship relative to storm centre
0°
0°
Track of steamship relative to storm centre
Approximate latitude of origin
10°S
10°S
Navigable Semicircle
EYE
Dangerous Semicircle
Alternative path
Track of steamship relative to storm centre
20°S
20°S
Characteristic path

Note.—In this diagram the isobars are shown as concentric circles about the eye; in practice this is usually the case within 150 miles or so of the centre. Outside this distance the isobaric form often loses its symmetry and strong winds often extend farther on the polar side than on the equatorial.

gain sufficient distance from the storm by putting out to sea, it will be preferable to remain in a reasonably sheltered harbour. If at sea and warning of an approaching storm is given and there is considered to be insufficient time or sea room to avoid the dangerous part of the storm area, it may be advisable for vessels of this type to seek shelter. In the China Sea, for example, there are so-called typhoon harbours which are listed in the Admiralty Pilot. In all cases, however, the mariner must use seamanship and initiative.

(3) **Local modification of the weather near the coast.** The information given in Chapter I on climate and weather in the area covered by the Pilot refers necessarily to the coastal and sea regions generally but cannot attempt to deal with the local effects on the wind and weather of each separate headland, bay, or creek. The following notes, however, should prove helpful in showing how the weather in the general vicinity is likely to be modified by the topography or shape of the land close to the actual place in which the mariner is concerned.

(i) If the coastline is steep-to, onshore winds that approach it at an angle are usually deflected nearly along the shore and increased somewhat in speed. And when the wind approaches a strait whose direction is somewhat similar to that of the wind, the wind tends to blow along the strait and increases in speed as the strait narrows.

When a strong wind blows directly towards a very steep coast, there is usually a narrow belt of contrary gusty winds close to the coast.

(ii) Similarly when the wind blows onshore towards the entrance to a wide estuary, especially one with hills on both sides, it generally tends to blow up the estuary. This effect is most marked in the afternoon but there is often no such tendency during the night and early morning.

(iii) An offshore wind is often squally on the lee side of hilly coasts, especially when the air is much colder than the sea, as for example when it blows off snow-covered land and when the wind over the open sea is force 5 or more.

(iv) Near headlands or islands with steep cliffs there may be large changes in direction (up to about 90°) and speed of the wind in addition to those mentioned above.

(v) During quiet and warm weather with clear or fairly clear skies, a sea breeze is of common occurrence during the warmer part of the day ; it is especially frequent in the tropics and subtropics. It blows onshore from, on the average, 4 to 8 hours after sunrise until shortly before sunset, reaching its maximum development during the afternoon (1300 to 1600) ; if there is an appreciable regional or general wind, then this will be modified by the onshore sea breeze. Under particularly favourable circumstances such as high dry temperatures, relatively cool sea, and hilly background to coast, the sea breeze may blow as much as force 4 (occasionally 5) and extend 20 miles or more to seaward from the shore. At night under similar circumstances a lighter breeze blows from the land to the sea ; it seldom extends more than 5 miles from the shore nor does it become appreciable much before 2200 local time ; under favourable conditions, as in the tropics, it usually lasts until an hour or so after sunrise.

(vi) When sea fog that is caused by the passage of warm air over a colder sea surface is general over the open sea, visibility is better close to leeward of a hilly island or promontory than to windward. This effect is most marked in late spring and summer, during the early afternoon when the land is at its warmest, and then applies to low-lying land as well.

(vii) Radiation fog which forms over land on quiet nights with clear skies, mainly in autumn and winter, and sometimes spreads a few miles out to sea, is least thick during the afternoon and is often worst during the first hour or two after sunrise.

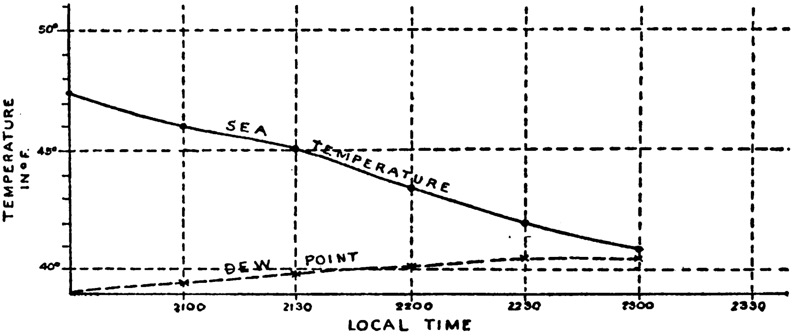
(4) **Forecasting sea fog.**—The most frequent type of fog in the open sea is that caused by relatively warm air flowing over a colder sea. Warning of this type of fog may be obtained by frequent observations of air and sea surface temperatures; if the sea temperature falls below the dewpoint of the air, fog is almost a certainty. The following procedure is recommended whenever the temperature of the air is higher than, or about equal to, that of the sea, especially at night when approaching fog cannot be seen until shortly before entering it.

Sea and air (both dry and wet bulb) temperatures should be observed at intervals of about 5 miles and the sea temperature plotted against dewpoint. The dewpoint is obtainable from tables published in various text-books, but at temperatures up to about 60° F. a close enough approximation may be obtained by assuming it to be the same amount below the wet-bulb temperature as the latter is below the dry-bulb temperature; for example, if the dry bulb reads 50° F. and the wet bulb 48°, the dewpoint is about 46°. If the curves of sea temperature and dewpoint converge, fog may be expected by the time at which they coincide.

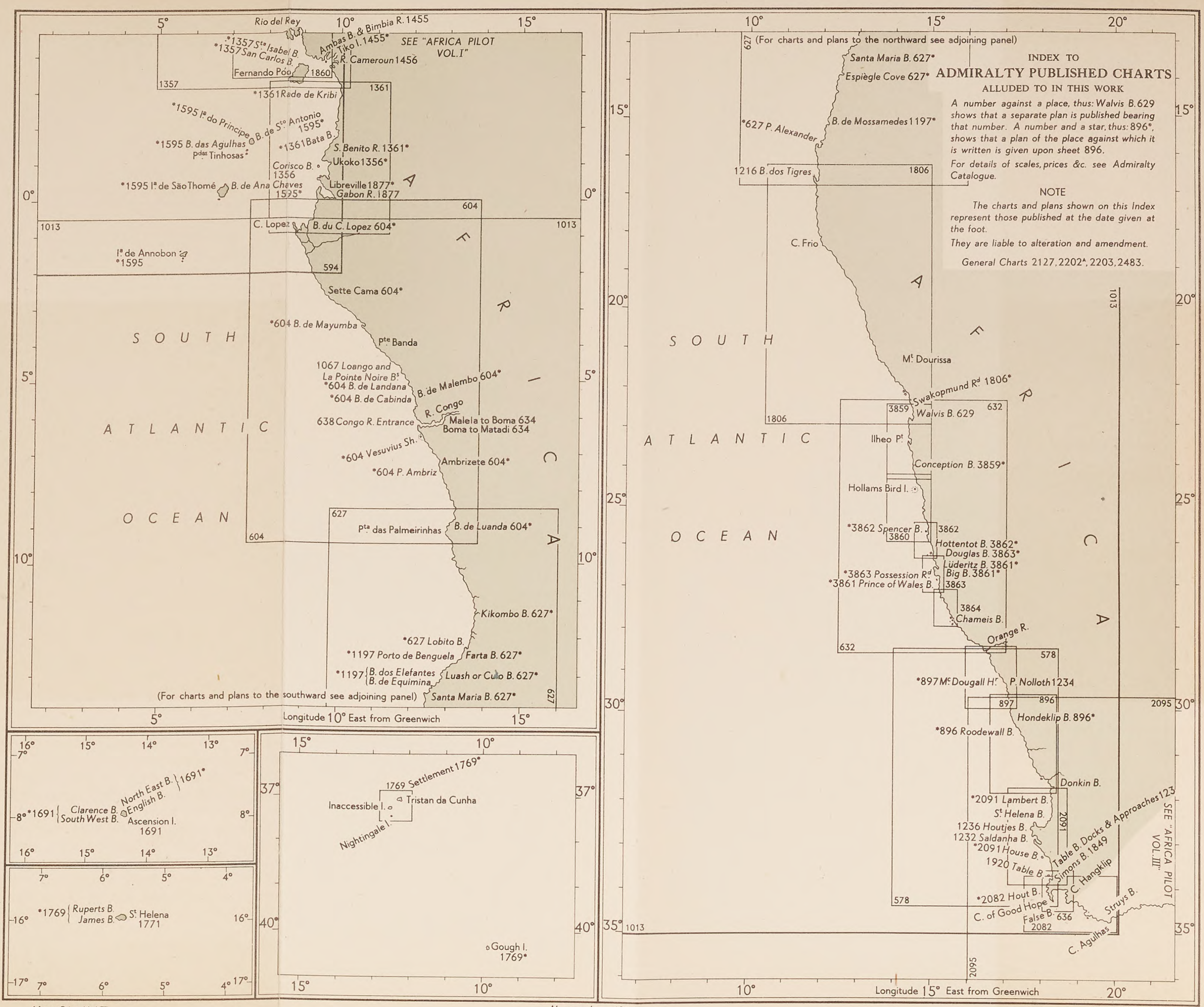
The figure below represents conditions that might be found by a low-powered ship in about long. 40° W. proceeding westward on the appropriate lane route for Halifax, Nova Scotia. At 2200 it would become evident that there is a probability of running into fog in about an hour's time, assuming that the sea temperature continues to fall at about the same rate that it has done during the last 1½ hours.

From the appropriate chart of average sea surface temperatures it can be seen where a rapid fall of temperature may be expected, so that if the dewpoint is within 5° or so of the sea temperature when approaching the colder water zone, this will also give a fairly reliable warning of fog.

If it is desirable and practicable to escape from fog, a ship should steer for warmer water which will again be evident from the charted isotherms.



Fog, or very poor visibility, at sea may also occur in snow or heavy rain, or in association with the passage of a warm front or occlusion, or, when within 20 miles or so of land, it may occur as a result of radiation fog extending from the land; in high latitudes in winter, sea smoke may be met near land, when very cold offshore winds are blowing, or near extensive ice. The method described above will not give warning of these fogs, of which frontal fogs, though common in middle latitudes, are neither so extensive nor so persistent in any one locality, and the other fogs mentioned are rarely encountered far from land (or extensive ice).



INDEX TO ADMIRALTY PUBLISHED CHARTS ALLUDED TO IN THIS WORK

A number against a place, thus: Walvis B. 629 shows that a separate plan is published bearing that number. A number and a star, thus: 896*, shows that a plan of the place against which it is written is given upon sheet 896.

For details of scales, prices &c. see Admiralty Catalogue.

NOTE

The charts and plans shown on this Index represent those published at the date given at the foot.

They are liable to alteration and amendment.

General Charts 2127, 2202ᴬ, 2203, 2483.

November 1951

C.B.H. 21749-Wt. 26511-Dd. H4200-4500-7/52

SD.2

IMPORTANT.

Details of Lights, Fog Signals, and Time Signals (visual) are not included in this volume; for this information the Admiralty List of Lights, Vol. 4, should be consulted.

Information regarding Vertical Movement of the Water is not included; for this the Admiralty Tide Tables should be consulted.

Details of Radio information (weather bulletins, storm and navigational warnings, time signals, fog signals, and D.F. stations) are not included; for this information the Admiralty List of Radio Signals should be consulted.

AFRICA PILOT

VOLUME II

CHAPTER I

BRITISH CAMEROONS — FRENCH CAMEROONS — SPANISH GUINEA — FRENCH EQUATORIAL AFRICA — PORTUGUESE POSSESSIONS — BELGIAN CONGO — SOUTH-WEST AFRICA — UNION OF SOUTH AFRICA — ASCENSION ISLAND — ST. HELENA ISLAND — TRISTAN DA CUNHA GROUP — GOUGH ISLAND — CURRENTS — TIDAL STREAMS — ROLLERS — ICE — SIGNALS — LIFE-SAVING — CAUTIONS — LOCAL MAGNETIC ANOMALY — AIR LIGHTS — SUBMARINE CABLES — BUOYAGE — COMMUNICATIONS — STANDARD AND SUMMER TIMES — FUEL — REPAIRS — BRITISH CONSULAR OFFICERS — REGULATIONS — DERATISATION — PASSAGES — CLIMATE AND WEATHER — CLIMATIC TABLES

BRITISH CAMEROONS.—General remarks.—The British Cameroons consists of that portion of the former German Cameroons, which lies between Nigeria and the other portion of the former German Cameroons which is now administered under mandate by France. It is a narrow strip of land, of a total area of 34,081 square miles, with an estimated population, in 1949, of 1,032,700.

It reaches from the Atlantic to Lake Chad, and lies between the parallels of 4° 00′ N. and 12° 30′ N., and the meridians of 8° 30′ E. and 15° 00′ E.

Chart 2202a.

The seaward end of the north-western boundary is the Akwayafe river, which enters the estuary of the Calabar river on the western side of Bakasi peninsula. The seaward end of the south-eastern boundary is an arbitrary line drawn from a position on the coast about 7 miles westward of Cap Cameroun to the junction of Matumal creek and Crique Victoria, whence it is formed by Nyubanan Yau, Mbakwele, and Mokola creeks, and after passing southward of Reiher island, by the Mungo river.

The territory, as stated above, is administered under the Government of Nigeria, and for this purpose consists of two main divisions, namely the Cameroons province and the Northern Cameroons; each of which is subdivided into administrative divisions.

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Chart 2202a.

The administrative capital is Buea, with a population, in 1951, of about 3,000.

Physical features.—The nature of the country varies to a remarkable extent from the coastal mangrove swamps and thick forest belts to the grasslands at heights of 4,000 to 7,000 feet (1,219^{m}2 to 2,133^{m}6) and over; yet another contrast may be seen in the sandy and swampy areas in the region of Dikwa and Lake Chad. A large lake, the Elephant sea, is situated near Kumba, and two comparatively small lakes, Barombi and Soden, lie about 30 miles northward of the Cameroons mountains. There are numerous rivers in the territory but rapids prevent their being fully utilised. The soil of the coastal region is fertile.

For Natives, *see* French Cameroons.

Trade.—Produce.—Currency, etc.—The chief exports are bananas, timber, cocoa, palm kernels, and palm oil. The chief imports are textiles, machinery, cement, implements and tools, kerosene, motor spirit, rice, salt, tobacco, etc.

The currency is British, similar to that in use in Nigeria.

Shipping.—During the year 1949, 74 and 57 vessels of total tonnages of 140,767 and 34,899 tons respectively, entered the ports of Victoria and Tiko.

Railways.—There is a railway which runs from Victoria to Buea.

FRENCH CAMEROONS.—General remarks.—The French Cameroons lies between the British Cameroons on the west, and French Equatorial Africa, and the Chad territory on the south and east; in the north it reaches the shores of Lake Chad. It comprises an area of about 166,489 square miles, excluding the 107,270 square miles ceded to Germany in 1911, and now included in French Equatorial Africa, and had, in 1950, a population of 3,006,162, of whom 8,998 were Europeans, mostly French. It is situated between the parallels of 0° 41′ N. and 12° 50′ N., and the meridians of 9° 21′ E. and 17° 30′ E.

The seaward end of the north-western boundary is that of the south-eastern boundary of British Cameroons, *see* page 1. The seaward end of the southern boundary is near the mouth of Crique Massotié in Bahia de Corisco, whence it runs in an east-north-easterly direction to the confluence of the Sanga and Ja rivers, close northward of Wesso. Owing, however, to the interposition of the enclave of Spanish Guinea, *see* page 4, the coast of French Cameroons does not comprise the whole of that lying between the above limits.

There is no distinct account of the discovery of the Cameroons river by Europeans, but it may be presumed to have been visited about the same time as Fernando Póo, that is, in about 1471. The name, derived from the Portuguese "camaroes," or prawns, was certainly bestowed upon it by one of the early explorers of that nationality.

An English Baptist Mission was established in the Cameroons in 1845, and in 1858 another body of members of the same mission, who had been working in Fernando Póo, settled at Victoria, now in British Cameroons, though the acquisition was not then formally recognised by Great Britain. Until the proclamation of the German Protectorate, by Nachtigal on 12th July, 1884, the Cameroons though

Charts 2203, 2127, 2483.

Chart 2202a.

visited by merchants and missionaries, did not come into the possession of any European power.

On 18th February, 1916, the territory was taken from Germany by British and French troops; and later, on the conclusion of hostilities was divided into the two mandated territories described above.

The seat of the Government is at Yaoundé (*Lat. 3° 51′ N., Long. 11° 39′ E.*), and the territory is divided into fifteen districts.

Physical features.—The surface of French Cameroons falls naturally into five main divisions. These are: The Cameroons plateau, the largest and most important division, covering the greater part of the centre and south of the territory, which rises from some 2,000 feet ($609^{m}6$) to elevations on the western boundary of from 4,000 to 10,000 feet ($1,219^{m}2$ to $3,048^{m}0$); the coastal region, situated on the western edge of this plateau and between it and the sea, which is traversed by numerous rivers, though rapids in most cases prevent the latter from being fully utilised; the lowlands of the Sanga basin, situated in the extreme south-east; the hill country of the Adamewa region which skirts the central plateau on its northern side at elevations of from 1,500 to 2,000 feet ($457^{m}2$ to $609^{m}6$); and the Lake Chad basin in the extreme north. Lake Chad is gradually decreasing in size; the average depth in it is from 10 to 12 feet ($3^{m}0$ to $3^{m}7$).

Flora.—Fauna.—There are mangrove swamps along the greater part of the coast extending sometimes 20 miles inland, pandanus and raffia palms grow on the lowlands, and higher up forests of large trees are matted together by a tangled network of tall creepers, beyond which is a plateau covered with high, reedy, and hard grasses. The cultivated plants are coconuts, oil palms, bananas, yams, ground nuts, sweet potatoes, cassava, and especially colcoasia, the taro of the South Sea islands, also cocoa, coffee, rubber, and kola.

Wild boars have been found in the marsh lands, as well as pelicans, herons, snipe, etc.

In the large rivers hippopotami and crocodiles, tortoises, and crabs exist, whilst on the banks snakes are met with.

In the forest proper, herds of elephants, antelopes, and buffalo exist, and monkeys, squirrels, and pigs are to be found. Guinea fowl and pheasants, also mosquitoes, sand flies, and ants abound.

The rivers are full of fish, many of them quite good to eat, amongst them being Nile perch.

Every fourth year, in the months of August and September, Rivière Cameroun and neighbouring estuaries swarm with little yellowish shrimps of the thallassina species, so closely packed that they are caught in baskets.

Natives.—The Cameroons is a region where great movement of peoples has occurred. The distribution of races and tribes is therefore a very complicated problem which, in the present state of the evidence (drawn almost entirely from philological considerations and native traditions), is far from solution.

The bulk of the population consists of Sudan and Bantu negroes. The line between these corresponds with fair closeness to the line between the northern savanna and the southern forest country, though the boundary is not very strongly marked.

In the Cameroons the Bantu, whose languages are much more closely related to each other than are those of the Sudan negroes,

Charts 2203, 2127, 2483.

fall into an older and a younger group. The first consists of the Bakoko and Bakundu groups in the south-west and the Maka group in the south-east; the second, which intervenes between the two sections of the first, consists of the Fang group. The Bangalla language is widely spoken in the south-east.

The relation of the Sudan tribes to one another is very obscure, and their languages differ widely. They mostly inhabit the country southward of Lake Chad and stretch across the territory in the interior. Some large tribes live in the open plains and high lands, and some small groups have been driven into the more inaccessible parts of the mountains.

The so-called Pygmies share the forest regions with the Bantus. These beings, called Bagielli, Babinga, Bumanjok, and Bomassa in various places, may represent the remains of an earlier population. Their numbers are insignificant and probably decreasing. Nothing is known of their language.

After the Bantu and Sudan tribes, the most important peoples are the Fulbe and the Hausa. The Fulbe are not numerically strong, but they control a number of well-organised states near the north-western frontier and are noted over the whole centre of the Cameroons for their slave raiding excursions. The Hausa, also, are not numerically very strong, but they are found across the whole centre of the territory and are known as skilful and adventurous traders.

Trade.—Produce.—The chief exports are palm kernels, timber, cocoa, palm oil, bananas, ground nuts, coal, and cement.

The chief imports are kerosene, motor spirit, salt, and cotton piece goods.

The wealth of the French Cameroons has been entirely agricultural though probably there are minerals in the northern part. In places there are huge and splendid plantations of cocoa, rubber and palm. All down the coast to Spanish Guinea there are plantations, and many exist inland, round Yaoundé and other centres. A certain amount of teak has been planted, while some ebony and much mahogany, which is exported, grows in the forests.

The country shows promising indications of the existence of a number of economic minerals, but no definite results have as yet been obtained. Gold and iron have been found.

Petroleum has been found in the estuary of Rivière Cameroun, near Douala, but numerous borings failed to produce satisfactory results. There is bituminous shale near Ossidinge.

Shipping.—In 1946, 314 vessels entered and cleared the two ports of Douala and Kribi.

Railways.—There is a railway from Douala to Yaoundé, and another from Bonaberi to Fumbum.

SPANISH GUINEA.—General remarks.—This Spanish colony comprises Spanish Guinea or Rio Muni settlement, on the continent, and the islands of Fernando Póo, Annobon, Corisco, and Elobey, having a total area of 10,852 square miles, with a total population in 1945 of 170,582.

Spanish Guinea is an enclave in the French Cameroons of about 9,470 square miles; it is bounded on its northern side by Rivière Campo until that river reaches the parallel of 2° 10′ N., and thence

Chart 2202a.

by that parallel; on its southern side it is bounded by the centre line of the fairway of Rio Muni from its mouth, situated between Punta Dieque and Pointe Coco Beach, as far as the mouth of Rio Tembony, thence by the centre line of the fairway of that river to its first intersection with the first parallel of north latitude, and thence by that parallel; its eastern boundary is the meridian of 9° 00′ E., of Paris, i.e., about 11° 20′ E.

Prior to 1778, Spain had no territorial possessions in the countries bordering on the Gulf of Guinea. In that year, Portugal ceded to Spain the two islands of Fernando Póo and Annobon, together with certain rights over the ports in the Gulf. Fernando Póo, had been discovered by Fernao-do-Poo, a Portuguese nobleman, in 1471, and Annobon on New Year's day of the following year by the Portuguese navigators Escobar and Santarem. In 1827, the Spanish Government permitted the British to form an establishment at Fernando Póo for the purpose of supplying provisions and stores to the British squadron under Captain Fitzwilliam Owen employed in suppressing the slave trade. A settlement was accordingly formed on the northern side of the island at Port Clarence, subsequently re-named Santa Isabel by the Spaniards; but about 1843, in consequence of the unhealthy nature of the climate and the expressed wishes of the Spanish Government, the establishment was abandoned, and the whole island reverted to the possession of Spain. In 1843 Spain placed those islands, together with the neighbouring district on the mainland, under her protection; and the boundaries of continental Spanish Guinea were finally settled in 1900.

For administrative purposes Spanish Guinea is divided into two districts; one consisting of the island of Fernando Póo only, and the other of the continental zone with the islands off the coast and also Annobon.

The whole territory is under a Governor General who resides at Fernando Póo.

Physical features.—Continental Guinea is generally flat, low and marshy, and offers little variety of feature. The coasts are fringed with shoals and the mouths of the rivers are blocked by bars. The coastal regions consist of plains, from 15 to 20 miles wide, which are covered with luxuriant vegetation and vast forests. Further inland the forests thin out and treeless plateaux intervene. The higher land of the interior preserves the same monotonous character, but there are some isolated mountains, the highest elevation reached being about 3,940 feet (1,200^{m}9). The principal river is Rio Benito which is about 360 miles in length and embraces in its basin two-thirds of the colony; in addition Rivière Campo and Rio Muni are alone worth mentioning here.

Fernando Póo is of volcanic origin and has a narrow coastal plain on all sides but the southern; there is a rich forest growth; *see* page 83. Annobon is of similar character but its vegetation is much less luxuriant; *see* page 105. Islas Elobey and Isla de Corisco are low-lying with a sandy soil; they are surrounded by extensive shoals; *see* pages 143 and 141.

Health.—The coastal settlements of Continental Guinea are malarious and unhealthy for Europeans.

Annobon is without doubt far healthier than the other islands in

Charts 2203, 2127, 2483.

Chart 2202a.

the Bight of Biafra, and this is attributed to the sea temperature being somewhat lower than farther north, and to the absence of marshy land and stagnant waters.

Natives.—The majority of the population of Continental Guinea is formed by the sub-tribes of the Fan or Fang race, called Pamué by the Spaniards and Pahuin by the French. This strong and vigorous race inhabits most of the interior, and is gradually overwhelming all the other peoples. The languages of all the various tribes belong to the Bantu family.

The natives of Fernando Póo belong to two classes; the aboriginal Bubi (formerly called Ediya) who occupy the interior of the island, and are only partly civilised, and the civilised Porto on the coast.

The Bubi are of Bantu stock, and probably represent the oldest race on this seaboard. The Porto, a corruption of Portuguese, are the descendants either of negro slaves, liberated during the British occupation of the island, or natives of Sierra Leone, who settled there of their own choice during the British occupation, and of Accras, with a strong admixture of Portuguese and Spanish blood.

English and Spanish are both spoken at Santa Isabel, but English remains the common speech of the coast people. Trade or pidgin English is used not only between whites and blacks, but also between natives with distinct languages of their own.

With the exception of a few Spanish officials and missionaries, Annobon is inhabited solely by negroes, the descendants, it is supposed, of a cargo of slaves shipwrecked whilst on their way to Brazil, from the Portuguese colonies in Africa, during the sixteenth century. They are hardy and inoffensive, and many of them speak English. They find good fishing along their coasts, and have little difficulty in growing sufficient food for their requirements. They are fond of the sea, and the men sometimes spend a few years as sailors in ocean-going vessels. The more civilised emigrate to more progressive colonial regions, and in consequence the population is continually decreasing.

Trade.—Produce.—Currency.—The trade and produce of Continental Guinea consist chiefly of cocoa, coffee, fruits, wood, and the district is said to be rich in minerals. The exports from Fernando Póo are nearly all cocoa, and the imports are principally wines, spirits, tinned foods, rice, salt fish, cotton goods, and building materials. The exports from Annobon, if any, are insignificant; the imports consist for the most part of tinned provisions, and building materials.

The currency in use in Spanish Guinea is the Spanish decimal system of pesetas and centimos.

FRENCH EQUATORIAL AFRICA.—General remarks.—The French possessions which together form French Equatorial Africa consist of the colonies of Gabon, Middle Congo, Ubangi-Shary, and Chad territory. The total area of the four colonies is 977,000 square miles, with a total population, in 1950, of 4,406,520, of whom 20,120 were Europeans. Southward it reaches nearly to the parallel of 5° 00′ S., and its northern frontier is in the vicinity of the Tropic of Cancer; its most easterly point is situated at the head-stream of the Bomu in longitude 27° 25′ E., and its most westerly extremity is at Cap Lopez in longitude 8° 42′ E. It is bounded on the north-west by French West Africa, Nigeria, and the Cameroons; and on

Charts 2203, 2127, 2483.

Chart 2202a.

the east and south by the Sudan, Belgian Congo, and the enclave of Cabinda.

Gabon is the south-westernmost of the colonies and possesses the only seaboard; Middle Congo is situated eastward of Gabon and abuts on the Congo between a position in the vicinity of Manyanga (*Lat. 4° 50′ S., Long. 14° 35′ E.*) and its confluence with the Ubangi whence it is bounded by that river; Ubangi-Shary is situated north-eastward of Middle Congo; and the Chad Territory is the northernmost of these possessions. The three southernmost colonies have an area of 496,000 square miles.

The coast of French Equatorial Africa extends from Crique Massotié *see* page 140, to the joint mouth of Rivière Loémé and Rivière Massabi.

French sovereignty in the Congo area was first established by treaty in 1839, but it was not until 1844 that effective occupation took place, and in 1848 that a capital was founded at Libreville.

By a decree of 16th October, 1946, French Equatorial Africa was re-organised as follows :—Under a Governor-General (at Brazzaville) it comprises the four territories of Gabon (capital Libreville), Middle Congo (capital Pointe-Noire, as from 28th February, 1950), Ubangi-Shary (capital Bangui), and Chad (capital Fort Lahmy), each of which is administered by a Governor.

Physical features.—French Equatorial Africa presents great geographical diversity, and the political divisions of the country correspond roughly with its natural regions. Gabon and Middle Congo belong in part to the region of coastal mountains and in part to the central basin of the Congo. They receive a heavy rainfall, much of their land is covered with dense equatorial forest, and they are occupied by a people of the Bantu stock. Ubangi-Shary belongs to the plateau country which separates the basin of the Congo from that of Lake Chad. It has a fairly long and well-marked dry season and is a typical savanna land. The majority of the inhabitants belong to the Sudanese branch of the negro race. The Chad territory slopes down from the plateau to the basin of Lake Chad to which it mainly belongs. It is transitional in every respect. Climatically it ranges from a region with a double rainy season to one which may only receive an occasional shower in several years. Its vegetation changes from the savannas of the south to the deserts of the north, and there is a corresponding change in its inhabitants; in the former region they belong to the negro race and have only a slight admixture of Arab blood, in the latter they are in the main of Arab or Berber extraction.

Health.—The size of the country, combined with the variety of local environments met in the different provinces, render it difficult to say whether the climate is good or bad, but in a general sense it cannot be considered healthy for the European. The death rate is much higher than in Europe. Malarial fever is generally prevalent throughout the country, and the individual who cannot stand regular, and at times fairly large, doses of quinine is incurring considerable danger by going to the country. Bilious fevers are common, and undue exposure to the sun is disastrous; latent weakness which may exist is speedily brought to light by the climate. Residence of any duration should only be undertaken by adults who are in perfect health and in a position to return to more temperate climates at regular intervals. Persons inclined to anæmia are only enabled to remain in

Charts 2203, 2127, 2483.

Chart 2202a.

the country through the continued use of drugs and tonics, and are bound to suffer.

Sleeping sickness exists in certain districts throughout the colony. Graduated doses of arsenic are recommended for those compelled to pass through or visit infected localities where the *Glossina* is known to exist. There are many good hospitals on the coast and elsewhere, and medical attention can always be obtained at or near fairly large centres.

Natives.—The principal tribes in French Equatorial Africa, and their localities, are as follows :—The Okande group, of which the chief families are the Mpongue, occupy the middle and lower valley of the Ogooué and the Oranga, a considerable delta of the same river ; the Goloa are found round Lambaréné and the Eshira-Ashango live on both sides of the N'Gounié. The Fiot group, to which belong the Bavili or Loango, occupy the country on both sides of the Lower Kouilou and the Bayaka that along the Upper Kouilou ; the Baloumbo and Bapouno live in the lower basin of the Nyanga and neighbouring districts. The Bateke group, consisting of the Bateke and the Balli, with whom they are closely connected, occupy the Bateke plateau. The Fan or Pahuin is a group of comparatively recent invaders and occupies the country north of the Ogooué and west of the Ivindo. The Bakota occupy much of the country north of the Likuala. The Bakale live in the districts southward of Moyen Ogooué, and the detached portion of Middle Congo is occupied in the main by the Mbwaka.

Trade.—Produce.—Currency.—The chief exports from French Equatorial Africa are wood, rubber, palm oil, coffee, cocoa, cotton, and ivory.

Ivory, which used to be brought in great quantities from the interior, was said to be the finest in Africa, but its production now is very much diminished. The supply of wood is practically inexhaustible ; ebony is obtained from the great forests near the head waters of the Gabon, and red-woods for dye are found along the banks of the rivers and creeks. Vegetation throughout is magnificent, and woods of various kinds, adapted for all purposes, abound. The country and soil are well adapted for cotton and other tropical commodities not indigenous to the country ; cotton, coffee, vanilla and cocoa have already been introduced, and sugar-cane grows luxuriantly on the banks of the river. Whaling commenced in 1922, and whale oil is now a considerable product.

The official coinage is that of France, but it is hardly current except in the European settlements.

Shipping.—The main ports are Port Gentil, Libreville and Pointe-Noire. In 1950, 854 vessels of a total tonnage of 4,086,500 tons entered these three ports.

Railways. — Waterways. — Airports. — Radio. — There is a railway from Pointe-Noire to Brazzaville, the capital of French Equatorial Africa and a river port which handled 156,200 tons of merchandise in 1950.

There are in the colony some 4,750 miles of waterways navigable for steamers during the whole, or part of, the year ; of these, 1,000 miles belong to the Gabon or coastal system, 2,500 miles to the Congo basin, and 1,250 miles to the Chad system. Unfortunately the navi-

Charts 2203, 2127, 2483.

gation of nearly all the rivers is much interrupted by rapids, but the colony possesses a large number of steamers, flat-bottomed barges, and motor-boats, suitable for river work.

Considerable developments are in hand in the construction of airports, the number aimed at being 67; one of which, at Brazzaville, will be able to take aircraft of 135 tons in weight. In 1950, 21,497 passengers arrived by air in the country, as well as 6,016 metric tons of freight.

The broadcasting station at Brazzaville is one of the most powerful stations in the world and broadcasts in about a dozen languages.

PORTUGUESE POSSESSIONS.—General remarks.—These consist of Angola, including the Cabinda enclave, and the islands of Principe and São Tomé. Angola or Portuguese West Africa is situated approximately between the parallels of 4° 20′ S. and 18° 00′ S., and the meridians of 11° 40′ E. and 24° 00′ E. The total area is estimated at 487,788 square miles and the population, in 1940, was 3,738,010, of whom 44,083 were Europeans. The country falls into two detached parts. Northward of the mouth of the Congo lies the Cabinda enclave, a district of about 3,000 square miles, which is surrounded on its landward side by French Equatorial Africa and the Belgian Congo. The main part of Angola lies southward of the Congo and is bordered on the north by the Belgian Congo, on the east by the Belgian Congo and Northern Rhodesia, and on the south by South-West Africa.

The islands of Principe and São Tomé are situated in the Bight of Biafra and have a total area of about 320 square miles. In 1940, the population of the two islands was 60,490, of whom 995 were Europeans.

The coast of Cabinda extends from the mouth of Rivière Massabi, to a position in the vicinity of Ponta N'gelo. The frontier between Belgian Congo and Angola is formed by the river Congo as far as a position about midway between Noqui and Ango Ango; the seaward end of that between Angola and South-West Africa is the mouth of Rio Cunene.

The coast of West Africa northward and southward of the mouth of the Congo, or Zaire as it is always called by the Portuguese, was first made known to Europeans by the voyage of Diego Cam in 1485. At the southern point of the entrance to the river he erected the first *padrão*, a stone column surmounted by a cross, which King João II had ordered to be set up on newly-discovered lands, and from which that point obtained the name it still bears.

Angola became a Portuguese dependency in 1574, but it was not until 1597 that serious attempts were made to colonise the country. About the year 1627 all attempts at development were suspended by the war waged by the rebel Queen of Angola against the Portuguese, of which the Dutch took advantage, and drove the Portuguese from Luanda. In 1648, however, the Dutch were expelled, and the country has since been in the possession of Portugal. Since the establishment of the Portuguese Republic, efforts have been made to divert to the magnificent and healthy plateau country of the interior, part of the stream of emigration which flows from Portugal, the Azores, and Madeira, to Brazil and the Sandwich islands.

The islands of Principe and São Tomé are said to have been dis-

Chart 2202a.

covered by João de Santerem and Pedro d'Escobar about the year 1470 or 1471, and have remained in the possession of Portugal ever since. The first-named was called after the Prince, eldest son of King Alfonso V, and the second received its name from the fact that it was discovered on St. Thomas's day.

Angola, including the Cabinda enclave, is under the administration of a Governor-General resident at Luanda, and by a decree of July 1946 it is divided into 5 provinces, with 16 administrative districts. The islands of Principe and São Tomé form a separate province under a Governor whose headquarters are in São Tomé; Principe is under a Lieutenant-Governor.

Physical features.—The greater part of the Cabinda enclave is a low plateau which in general terminates along the seaboard in cliffs of no great height. The surface soils are either sands or clays and there are considerable areas of marsh-land. In the north-east, the land is higher but is much cut up by the rivers.

Angola belongs mainly to the north-western portion of the South African plateau, and the chief features of its structure are simple. The coast is fringed by a plain, which in the north has a breadth of 150 miles or more, but narrows until it practically disappears near the parallel of 17° 00′ S. Behind the plain the land rises in steep escarpments to the South African plateau which extends inland, and has an elevation over vast areas varying from 4,000 to 6,000 feet (1,219^{m}0 to 1,828^{m}8). In the east, and beyond the Rio Cuanza, the land falls to a region which is more level than the plateau.

From the coast and the lowlands which border the Congo, the land in the northern part of the main portion of Angola rises to the first plateau attaining an elevation of about 2,000 feet (609^{m}6). The second plateau, the ascent to which is very steep, is traversed by many streams, and its surface, which lies at a height of between 3,000 and 3,500 feet (914^{m}4 and 1,066^{m}8), is generally undulating in character. Further southward, along the parallel of Luanda, the coastal zone, there about 90 miles broad, is generally flat; over wide stretches of country some districts are entirely bare, while others have a covering of bushes and grass. Inland the country rises gradually to the central plateau, which has an elevation of between 4,000 and 5,000 feet (1,219^{m}2 and 1,524^{m}0), a great part of it being broken and often mountainous country. Still further eastward lies the wild Lunda region, of which very little is known.

In the central part of Angola the coastal plain is much narrower than further northward, and consists in the main of barren wastes. From the coast the land rises, in a series of terraces, to an elevation of about 1,000 feet (304^{m}8), and thence to the highest plateau in this part of Africa, which lies at a height of from 7,000 to 8,000 feet (2,133^{m}6 to 2,438^{m}4). On the eastern side of this plateau the country declines with a gently rolling appearance to a level plain which stretches to the Congo-Zambezi divide.

In southern Angola, the land in the vicinity of Mossamedes rises gradually for a distance of about 100 miles to an elevation of over 2,000 feet (609^{m}6), whence it speedily rises to a height of from 6,000 to 7,000 feet (1,828^{m}8 to 2,133^{m}6); further southward, however, there is practically no coastal plain. Towards the north, the escarpment appears to break up into several distinct ranges, but in the south

Charts 2203, 2127, 2483.

Chart 2202a.

there is a high massif which falls steeply, and in places precipitously on its eastern side to the Huilla plateau, which is comparatively level and does not exceed an elevation of 4,000 feet ($1,219^{m}2$). Further eastward the country has the appearance of a sandy plain.

Most of the rivers of Angola which flow into the Atlantic ocean are of little use as waterways. Those which rise upon the margin of the plateau are little more than mountain torrents, and those which flow from the interior are so interrupted by rapids that they are seldom navigable for any considerable distance. In the middle of the province are the Cubango and Cuito, both reported to be navigable; and in the northern part are two important rivers, the Kuango and the Kasai, both of which are tributaries to the Congo.

The islands of Principe and São Tomé are mountainous and the soil is volcanic; the latter island is composed of compact and heavy basaltic rock, covered by a very fertile soil. *See* pages 91 and 97.

Health.—Throughout Angola generally, the high plateau, which has a large native population, is the most important region, as its climate is believed to be suitable for European settlement on a large scale. The northern districts, having a high temperature, might be suitable for the cultivation of cotton and tobacco; but the southern districts are too arid for farming, except in a few watered parts. The central portion seems to be the most favoured, both as regards soil and climate.

The lowlands are on the whole less healthy than the uplands. Sleeping sickness has been fairly common at times along the coast as far southward as São Félipe de Benguela (*Lat. 12° 35′ S., Long. 13° 24′ E.*), but no evidence exists that it has ever been endemic on the plateau heights of over 3,500 feet ($1,066^{m}8$). Malaria is prevalent in the lowlands and along the coast, and during the rainy season it is not uncommon in some parts of the uplands. Blackwater fever exists, leprosy in a mild form is rather common amongst the natives, and smallpox has often proved a scourge. Pleurisy and pulmonary diseases affect the natives, and a disease known as katumbu, and somewhat similar in its symptoms to whooping cough, is common amongst children.

Flora.—Fauna.—Except in Cabinda, where it is covered by herbaceous plants, the coastal lands of Angola are as a rule badly watered and unfertile. Under and on the escarpment there is generally a luxuriant vegetation; the baobab, various kinds of cluphorbia and fiscus-trees, and African mahogany abound, also rubber-producing plants and sansevieria are found. On the plateau, the greater part is covered by the common African grass, the baobab grows everywhere and African mahogany and other timber trees are common. In the southern and arid district the baobab and spiny acacias are the chief trees. Of commercial importance are the African mahogany; several plants from which rubber is obtained; *Eriodendron anfractuosum* from which kapok is obtained; *Sansevieria cylindrica* from which fibre is obtained; the oil palm; and *Caffea arabica,* a coffee which is a native of Angola. Grass varies greatly in quality. In many of the higher parts of the plateau, where rainfall is fairly abundant, it is too rank and cattle refuse to eat it. As a rule the best pasturage is to be found at elevations below 3,000 or 3,500 feet ($914^{m}4$ or $1,066^{m}8$). Vegetation in the islands of Principe and São Tomé is both rich and various.

Charts 2203, 2127, 2483.

On the coastal plains of Angola there are few animals, except in the river valleys where antelopes, gazelles, and similar animals are found; monkeys and parrots are common in the woods, and the hyena sometimes wanders down from the hills. In the forests on the escarpment the lion, leopard, and zebra are common, and the elephant is found; big game is plentiful, and in the higher districts wild pigs and goats are numerous. On the plateau, savanna conditions prevail over considerable areas, and the fauna resembles that found in similar regions in other parts of Africa. Elephants exist in large numbers and in the north appear to be increasing; in the south large herds roam over the veldt in the unexplored land between Rio Cubango and Rio Cunene, and there are some rhinoceros, but both these animals are royal game and not to be shot at the present time. The colony is famous for the giant sable, the antelope with the longest horn of any game animal, but it also is protected. Buffalo, deer, antelopes, leopards, wolves, and jackals appear to be common over the greater part of the plateau. In the south gemsbok are met in considerable numbers roaming over the Mossamedes desert, as are two kinds of zebras. The Cape buffalo are fairly numerous along the lowland rivers, such as the Caporolo, and in the north, near Luanda, the red dwarf variety, or bush-cow, hold their own in the swamps and thick vegetation of the more tropical part of the colony. Gnu, hartebeest, tsessaby, and roan and black-faced impala are other animals which are found; as well as lions, leopards and cheetahs.

Hippopotami, crocodiles, and alligators frequent many of the rivers; pythons, cobras and other kinds of venomous snakes are common in various parts of the country. The rivers abound in fish, one variety, the bagre, being much esteemed as a native food.

The tsetse fly which causes sleeping sickness, the mosquito which carries malaria, and the salalé or white ant destructive to crops, trees, and buildings, are all found in the lowlands. The white ant is also common on the plateau; in many of the old ant hills in that region wild bees have established themselves and wax is collected therefrom by the natives.

Principe has been cleared of the tsetse fly, which at one time threatened to stop completely all planting on the island.

Natives.—In the Portuguese enclave of Cabinda the chief tribes are the Cabindas and the Mayumbes, the former living near the coast and the latter in and around the hilly country of the interior; the natives of the Cabinda tribe are docile, industrious, and intelligent; they manufacture cloths for their own use, and construct boats for carrying on commerce along the coast.

The native population of Angola belongs to two distinct races, the Bantu and the Bushman. The Bantus are not indigenous to the country but represent an invasion from the northern and north-eastern part of the continent. They belong to the same ethnic stock as the majority of the Congo people and were spreading over the whole of South Africa when the movement was stayed by the European invasion. About 40 different tribes have been recognised but it is impossible to give a complete account of their distribution as the same tribe has often more than one name, and various writers adopt their own classification.

The tribes occupying the coastal plains and slopes of the escarpment

Chart 2202a.

are :—South of the Congo, in the northern part of the district, Mussorongos ; along the route of the Luanda-Malangé railway, N'Golas ; between Novo Redondo and Pôrto do Lobito, Musseles and Amboins ; in Mossamedes district, Becuissos in the north, and Giraues and Quipellas in the south. All these tribes, as well as those in the interior, speak dialects of the Bantu language. In the district of Congo, Congo dialect predominates, and the languages spoken over the greater part of Angola are closely allied to it and belong to the M'bundu group.

The Bushmen are undoubtedly the original element in the population of Angola. Several distinct types have been recognised of which the most important are the Bacurocas and Mucanclas. They are confined almost entirely to the south-eastern districts. In 1876 a number of Boer families migrated from the Transvaal and eventually arrived at Humpata. In 1906 it was estimated that more than a thousand of them were scattered over the hills of Huilla, but within the last few years there appears to have been a movement back to South Africa and probably comparatively few are now left in Angola.

In the north, agriculture is the chief pursuit of the natives, but it is of a most primitive description. The Ondulos are blacksmiths and traders ; the Luvali are fairly good workers in copper ; and the Biheans and other tribes of the Ovibundu are engaged in trade with the interior ; in all these tribes agricultural work is left to the women. The Mambus-Kuchus carry on a considerable trade in goats and cattle on the lower Logengue.

The natives of Angola are capable of being trained to do work to which in the past they have been unaccustomed, and there is a considerable demand for them as labourers in other parts of Africa. For a number of years they supplied practically all the labour required in the cocoa plantations of São Tomé and Principe, and more recently attempts have been made to employ them in the copper mines of the Katanga.

The European population, found mainly in the towns and coastal districts, is with few exceptions either Portuguese or of Portuguese descent.

In Principe and São Tomé, the natives are good but lazy and require a lot of handling ; imported labour is employed consisting of Bantus from Angola and Mozambique, and Cabindas and Cape Verde boys.

Trade.—Produce.—Currency, etc.—The chief exports of Angola are diamonds, sugar, coffee, maize, cotton, dried fish, wax, sisal, and coconuts. The chief imports are wines and spirits, foodstuffs, metals, coal, vessels and vehicles, machinery and textiles.

The chief exports of the islands of Principe and São Tomé are cocoa, coffee, coconut and copra, palm oil, and cinchona.

The products of Cabinda are mostly ivory, gum, wax, and honey ; there is also a little trade in orchil and gum copal.

Coffee is grown in the forest belt between the coastal plain and the plateau. Maize is by far the largest crop in the province and is the most valuable. The oil-palm has long been one of the chief products of the country ; it is grown in various parts of the province, but chiefly on the escarpment between the coastal plain and the plateau. Sugar is one of the most flourishing industries in Angola, and cotton and tobacco have been receiving a great deal of attention. Other crops include beans, rice, wheat, cocoa, etc. Owing to the fall in the price

Charts 2203, 2127, 2483.

Chart 2202a.

of rubber and the difficulties of transport, that commodity is no longer gathered in any quantity.

The mineral possibilities of the country are problematical, although there are deposits of copper and coal; development has so far been confined to diamonds; the stones produced are generally small, but of very good quality.

Cocoa is the staple product of the islands of Principe and São Tomé, both of which have two cocoa harvests annually; the first crop is gathered in March or April and the second in October or November, but the latter is most important.

The currency unit is the Angolar of 100 centavos. One thousand Angolares is known as a conto. The Angolar is equal to one Portuguese Escudo; a new coin has also been introduced, called a "macuta," equal to 5 centavos.

The metric system of weights and measures is used. The arroba, equal to 15 kilos, is a weight in general use.

Railways.—Air lines.—The Benguela railway runs from Lobito to the border of the Belgian Congo, where it connects with a line through the Belgian Congo and Rhodesia to Beira in Mozambique; the total length of this track is 2,920 statute miles. It also is linked up with the South African railway system. Another railway runs from Luanda to Malange, a third line runs from Pôrto Amboim for a short distance inland, and a fourth runs from Mossamedes to Lubango.

Regular air service is maintained from Luanda to the principal towns and ports in Angola, as well as to Pointe-Noire and Leopoldville.

Shipping.—In 1949, 3,748 vessels with a total net tonnage of 3,855,905 tons entered Angolan ports.

BELGIAN CONGO.—General remarks.—The Belgian Congo is situated in the basin of the Congo river, and lies between the parallels of 5° 20′ N. and 14° 00′ S., and the meridians of 12° 05′ E. and 31° 18′ E. It has an area of about 909,654 square miles, and a population on 31st December, 1949, of 11,073,311 natives and 53,176 whites. It is bounded on the west, by the Portuguese enclave of Cabinda and French Equatorial Africa; on the north, by French Equatorial Africa and the Sudan; on the east, by Uganda and Tanganyika territory; and on the south, by Northern Rhodesia and the main portion of Angola.

The seaboard of the Belgian Congo extends from a position, in the vicinity of Ponta N'gelo to the mouth of the Congo; but the territory includes the right bank of the Congo as far as a position opposite and nearly midway between Noqui and Ango Ango, whence it includes both banks as far as a position in the vicinity of Manyanga; thence the left bank only as far as the confluence of the Congo and Ubangi above which both banks are in Belgian territory. The southern boundary of the Belgian Congo leaves the left bank of the river between Noqui and Ango Ango and follows the parallel of 5° 52′ S. as far as the River Kuango whence it extends in easterly direction to Lake Tanganyika.

The earliest European country to form relations with the Congo was Portugal; after Diego Cam's discovery of the mouth of the river in 1485 and his ascent to the foot of the falls, which he recorded by an inscription carved on the face of a rock high above the water level,

Charts 2203, 2127, 2483.

Chart 2202a.

a formal embassy was sent to the local King in 1490. Up to the year 1878 the mouth of the river was under no European jurisdiction; British, French, Dutch, and Portuguese commercial posts were established on it for trading purposes, but outside their limits anarchy prevailed. In 1878, H. M. Stanley arrived in Europe having completed his great journey to solve the problem of the actual course of the Congo, and Leopold II, of Belgium, created the Comité d'Études du Haut-Congo. In 1885, that monarch assumed the sovereignty and proclaimed the neutrality of the independent Congo State; but in 1908 the territory was annexed by Belgium and became a colony of that kingdom.

In July, 1919, the districts of Ruanda and Urundi, portions of the former territory of German East Africa, were assigned to Belgium, and in July, 1922, a mandate confirming that assignment was issued by the Council of the League of Nations. These districts lie eastward of Lakes Kivu and Tanganyika and south-westward of, though not bordering on, Lake Victoria. They have an area of 20,900 square miles, and a population, in 1949, of 3,882,392 natives as well as 3,407 Europeans and 2,894 Asiatics. Usumbura, with a population of 17,700, is the capital.

The legislature is exercised by the Metropolitan authorities; in case of emergencies this is delegated to the Governor-General who legislates by ordinance. The executive power belongs to H.M. the King of the Belgians, assisted by the Minister for the Colonies. The King, who is president of the Colonial Council, is represented in the colony by a Governor-General, assisted by a Vice-Governor-General, a Secretary-General, a Commander-in-Chief of the forces, 6 Provincial Governors, and 7 Directors-General.

The colony is divided into 6 provinces:—Leopoldville (capital Leopoldville), Katanga (Elisabethville), Eastern (Stanleyville), Kivu (Costermansville), Kasai (Lusambo) and Equator (Coquilhatville). The provinces are divided into 20 districts, the districts into territories (122) or cities (3). The capital of the colony, formerly at Boma, was transferred to Leopoldville in 1927.

In addition, the mandated districts of Ruanda and Urundi are, by a law dated the 21st August, 1925, placed under the direction of a Vice-Governor.

Physical features.—Practically the whole region drains to the Congo river, and the chief means of access is from the Atlantic coast, but the river does not give that unity to the country which might be expected as both it and its tributaries are in certain parts of their courses interrupted by falls. The low plateau which forms the basin of the central Congo lies between the highlands of Eastern Africa and the coastal ranges of Western Africa. It is bordered on the south-east by the Katanga, a continuation of the high veldt of South Africa and Rhodesia, and on the south by the lower lands of the Angola plateau. In the east it rises to the mountains bordering the great rift in which lie Lakes Albert, Edward, Kivu, and Tanganyika, and on the north-east to a lower plateau which forms the divide between the waters of the Nile and those of the Congo.

The Belgian Congo consists in reality of two distinct parts which differ vastly from one another in appearance, climate, and productions. There is firstly the valley of the main river from Stanley pool to

Charts 2203, 2127, 2483.

Chart 2202a.

the Stanley falls with the lower reaches of the principal tributaries, which are distinctly tropical in character. The other part of the colony consists of open fertile country which rises from the Kasai river in the west, and the Sankuru and Lomami in the north-west, and running south-eastwards, culminates in the high plateau of Southern Katanga.

Natives.—The population of Belgian Congo is of Bantu origin. The native languages comprise many dialects, every tribe having its own. Kiswahili is the language spoken by the natives who have been under Arab influence. Bangala is the commercial language on the Upper Congo; Fiote is used on the Lower Congo. Sleeping sickness is said to be making great ravages amongst the inhabitants, especially in the Lower Congo.

Trade.—Produce.—Currency, etc.—The chief exports are copper, gold, diamonds, tin, manganese, palm kernels and palm oil, cotton, coffee, and copal. The chief imports are provisions, liquid fuel, iron and steel products, machinery, and cotton piece goods.

In 1936, 293 ocean-going vessels, of a total tonnage of 1,045,207 tons, entered the ports of Boma, Banana, and Matadi.

The chief products are maize, rice, manioca, bananas, oil palms, cotton, rubber, and coffee and ivory. Rice and manioca are grown in a great number of the native villages. Plantations of rubber, oil-palm, coffee, and cocoa have been established by the Government and by private enterprise. Cattle thrive in all districts where there is no tsetse fly, notably in the highlands of the Katanga, Ituri, and Kivu.

The chief minerals are gold, diamonds, copper and tin; iron and bauxite are known to exist. Mining is an important industry, the principal mines are those for copper near Kambove in Upper Katanga and the diamond mines in the Province of Lusambo; radium is produced from the Chinkolobwe mines.

The currency is the Congolese franc, and is now generally used, even by the natives.

The metric system of measurement is in force.

Communications.—The following railways exist in the Belgian Congo: Boma to Tshela; Ango Ango *via* Matadi to Kinshasa and Leopoldville; Stanleyville to Ponthierville: Kindu to Kongolo; Kabalo to Albertville; and Ilebo to Elizabethville and thence *via* the railways of Rhodesia and the Union of South Africa to Cape Town.

The Colony possesses about 8,000 miles of river waterways navigable by large or small river-steamers. This mileage is almost entirely contained within the central equatorial basin, outside which only a few short stretches are navigable. The main waterways in the Congo river are:—Leopoldville to Stanleyville, 1,050 miles; Ponthierville to Kindu, 196 miles; Kongolo to Bukama, 397 miles, this last being only available under favourable conditions. The points between which navigation is impossible are connected by the railways described above. In the Kasai-Sankuru rivers, the main waterway is from Kwamouth, at the junction with the Congo, to Lusambo or Pania Mutombo, a distance of 660 miles. The Ubangi river, the greatest tributary to the Congo and boundary between French and Belgian territories, is broken in places by rapids, but is otherwise navigable by steamers as far as Mokoange, and during the high river season as far as Banzyville.

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Chart 2202a.

A regular air service runs between Brussels and Leopoldville, Stanleyville and Elisabethville. Air lines also connect with Cairo, Nairobi, New York and Johannesburg.

SOUTH-WEST AFRICA.— General remarks.—South-West Africa lies between the parallels of 17° 00′ S. and 29° 10′ S., and the meridians of 16° 30′ E. and 21° 00′ E., and has an area of 317,725 square miles with a population in 1946 of 352,075, of whom 37,858 are Europeans. It is bounded on the north by Angola, on the east by the Bechuanaland protectorate and the Union of South Africa, on the south by the Union of South Africa, and on the west by the Atlantic ocean.

The seaboard of South-West Africa extends from the mouth of Rio Cunene to that of the Orange river.

Within this territory for administrative purposes, but not part of it, is the small British possession of Walvis bay, with an area of 374 square miles, the sea board of which extends from Swakop river to a position about 30 miles southward of it. Walvis bay had a population, in 1946, of 639 Europeans and 1,773 non-Europeans.

South-West Africa consists of the provinces of Damaraland and Great Namaqualand, which together formerly constituted German South-West Africa, and had been occupied by that country since 1884. In 1915, these provinces were taken by the Union of South Africa, and are now administered by the Government of the Union, acting under a mandate issued by the League of Nations.

An Administrator, appointed by the Union Government, controls every form of Government activity in the territory, including all the functions of a Provincial Administration, the railways alone being excepted from his authority. He is assisted by an Advisory Council of representative citizens, and the seat of Government is at Windhoek, the capital.

Physical features.—The country consists of a slowly rising, sandy, coastal belt, a high interior plateau reached at a distance of from 60 to 100 miles from the coast, and a gently falling eastern strip of sandy country that merges into the level expanse of the Kalahari desert. The highest part is found in Damaraland where elevations of over 8,000 feet (2,438^{m}4) are attained. The whole southern part, and much of the eastern, is barren and desert, but extensive boring operations for water have been carried out, in many cases successfully. The coast from Cabo Negro to beyond Itshabo island, off Luderitz bay, is a desert region of arid sands, though at times heavy dews are experienced.

Natives.—The principal native races in South-West Africa are the Ovambos, Hereros, Bergdamaras or Klipkaffirs, Hottentots, and Bushmen.

The Ovambos are a Bantu race and are agriculturists; they still possess tribal organisation to its full extent.

The Hereros are a pastoral people who formerly owned enormous herds of cattle. The Germans oppressed them, their tribal organisation completely disappeared and they were scattered throughout the country on farms and in the different towns where they formed the ordinary source of labour. The Hereros make excellent herdsmen; since the British occupation of the country, reserves have been set

Charts 2203, 2127, 2483.

Chart 2202a.

apart for them and they have considerably increased in numbers and in animal wealth.

The Bergdamaras are, it is believed, also of Bantu origin, though some authorities hold that they belong rather to the Hottentot race whose language they now speak. They are an inferior tribe, and were alternately the slaves of the Hereros and the Hottentots in pre-European days, as the former or the latter were in the ascendant.

The Hottentots, so-called, consist of two distinct sections: one whose remnants are found in the central portions of the country, being of pure native extraction the source of which is but little understood; the other is composed of tribes resulting from an admixture of European blood in the Cape with the Hottentot races residing there a couple of centuries ago, which, after conflict with their European neighbours, sought refuge across the Orange river.

The Bushmen are the oldest inhabitants of South-West Africa, and are found in considerable numbers in its eastern portion from the parallel of 26° 00′ S. to its northern boundary.

In the centre of the country just south of the Windhoek district, is the Behoboth Gebiet occupied by a semi-independent race known as the Bastards, whose origin is much the same as that of the second class of Hottentots mentioned above, except that the admixture of European blood is much greater, and their ordinary language is Cape Dutch. These people control their own affairs to a very large extent and are governed by a Raad, or council, which is partly hereditary and partly elected; the Administration is represented by a Magistrate who asists them with advice and takes cognizance of serious crimes.

Trade.—Produce.—Currency, etc.—The chief exports of South West Africa are diamonds, copper, butter, hides and skins, vanadium, lead, and tin. The chief imports are machinery, foodstuffs, textiles and fertilizers.

South-West Africa is essentially a stock-raising country, the absence of water rendering agriculture, except in the northern and north-eastern portions, almost impossible. Generally, the southern half of the territory is suited for the raising of small stock, while the central and northern portions are better fitted for cattle.

The staple product is diamonds, which are found along the coast from the Orange river to Conception bay. The fields are alluvial and the deposit shallow. The stones are small but of very good quality. Other minerals worked are copper, rich deposits of which exist at Tsumeb and in its neighbourhood, vanadium, marble and tin. Gold and silver are known to exist but in quantities too small to be worked remuneratively.

The currency is that of the Union of South Africa, *see* below.

Communications.—There is a railway from Walvis bay and Swakopmund to Tsumeb and Grootfontein, also to Windhoek and *via* Keetmanshoop to the railway system of the Union of South Africa; from Lüderitz bay to Keetmanshoop, Warmbad, and the railway system of the Union of South Africa; and from Kolmanskop to Bogenfels.

The principal towns and villages are connected to the general telegraph system. Windhoek and Keetmanshoop are connected by regular air services with Cape Town, Kimberley, Bloemfontein and Johannesburg.

Charts 2203, 2127, 2483.

Charts 2202a, 748a.

UNION OF SOUTH AFRICA.—General remarks.—The government of the Union of South Africa is constituted under the South Africa Act of 1909, the self-governing colonies of the Cape of Good Hope, Natal, the Transvaal, and Orange River Colony being united under one government in 1910, these colonies becoming original provinces of the Union under the names of the Cape of Good Hope, Natal, the Transvaal, and the Orange Free State. The seat of the Government is at Pretoria, and that of the Legislature at Cape Town. The executive is vested in a Governor-General, appointed by the Sovereign, aided by an Executive Council, with a Legislature of two Houses.

The total area of the Union is 472,494 square miles divided between the provinces as follows:—The Cape of Good Hope, 277,113 (which includes the 374 square miles of Walvis bay); Natal, 35,284; the Transvaal, 110,450; the Orange Free State, 49,647.

In 1946 the total population of the Union, by census, was 11,418,349, of which 2,372,690 were Europeans; of the coloured population 7,831,915 were Bantu, 285,260 were Asiatics, and 928,484 were Hottentots, Fingoes, Kaffirs, Bechuanas and other mixed races.

On 25th December, 1947, the Union formally took possession of Prince Edward island (*Lat. 46° 36′ S., Long. 37° 57′ E.*); and on 30th December, 1947, of Marion island (*Lat. 46° 52′ S., Long. 37° 45′ E.*), about 1,200 miles south-eastward of the Cape of Good Hope, *see* Antarctic Pilot.

Trade.—Produce.—Currency, etc.—The principal product of the Union is gold, but diamonds, and other minerals are produced. As regards exports, gold takes first place, wool comes next, then diamonds, and hides and skins; other commodities exported are sugar, fruit, bark, coal, angora hair, fish, meats, tobacco, wines, ostrich feathers, and butter and butter substitutes. A considerable proportion of the imports are represented by textiles and wearing apparel; other important imports are hardware, machinery and vehicles.

The currency of the Union is similar to that of Great Britain, but accounts are sometimes kept in schillings, equal to 2¼d., and rixdollars, equal to 1s. 6d.

An act was passed in 1922 legalising the optional use of either the metric or the imperial weights and measures; but under a Proclamation of 1923 the "cwt." has been replaced by the "cental" of 100 lbs. The following old Dutch measures are also often used:—

Morgen = 2·11654 acres.
1,000 Cape lineal feet = 1,033 British imperial feet.
Leaguer = about 128 imperial gallons.
Half aum = 15½ imperial gallons. Anker = 7½ imperial gallons.
Muid = 3 bushels.

Shipping.—In 1949-50, 10,356 vessels of all categories, with a total gross tonnage of 42,408,123, entered the ports of the Union.

Guano.—This fertiliser is obtained from a number of Government guano islands situated on the western and southern coasts of South Africa. Regulations regarding these islands are promulgated in Union Government Proclamation No. 158 of 1936, which states that landing on the islands without a permit is prohibited, and also that, in the territorial waters of the Union, it is forbidden to kill or disturb seabirds

Charts 2203, 2127, 2483:

Charts 2202a, 748a.

or to take their eggs. The killing or capture of seals is also prohibited, except at certain times of the year with the necessary permit.

The islands are as follows:—Hollam's Bird island, Merker and Itshabo islands, Seal and Penguin islands (Lüderitz bay), Halifax island, North and South Long islands, Possession island, Albatross rocks, Pomona, Plum Pudding, and Sinclair islands, Elephant rock (Oliphant's river), Penguin islet (Lambert bay), Seal island (off Great Paternoster point), Jacob reef, Marcus, Malagas, Jutten, Schapen, Meuuw, Vondeling, Dassen, and Duiker islands, and Seal island (False bay).

Communications.—All the ports suitable for overseas vessels are connected to the railway systems of the Union of South Africa, Rhodesia, and Moçambique. The South African Railways and Harbours Administration operated, in 1950, a total of 13,329 miles of railways, as well as road motor services with a route mileage of over 25,000 miles.

An internal airways system is operated by South African Airways and trunk air lines connect regularly with East and West Africa and Europe.

Charts 2095, 2202a, 748a.

Cape of Good Hope Province.—General remarks.—The Cape of Good Hope is in reality the small promontory, at the southern end of the Cape peninsula, which forms the south-western extremity of the Continent of Africa.

Cape of Good Hope province lies between the parallels of 24′ 50′ S. and 34° 50′ S., and the meridians of 16° 27′ E. and 30° 05′ E. On the east, south, and west it is bounded by the Indian and Atlantic oceans. On the north, the Orange river is the boundary between the province and South-West Africa as far as the meridian of 20° E.; thence the province is bounded by the Bechuanaland protectorate, the Transvaal, the Orange Free State, Basutoland and Natal. It has an area of 277,113 square miles, including the 374 square miles of Walvis bay, with a population, in 1946, of 4,053,848, of whom 870,795 were of European stock.

The coast of the province, eastward of Cape Hangklip (*Lat. 34° 24′ S., Long. 18° 50′ E.*), is described in Africa Pilot, Volume III.

The Cape of Good Hope was discovered in 1486 by Bartholemeu Diaz, who named it Cabo Tormentoso, or Stormy cape; but King João II of Portugal, convinced that it was the turning point of the long-desired route to India, gave it the name of Boa Esperanca, or Cape of Good Hope; his convictions were confirmed eleven years later by Vasco da Gama, who then rounded the cape and landed in what is now known as Natal.

In the year 1652 the territory was colonised by the Dutch East India Company, under Van Riebeck, and continued in their possession until 1795, when the British Government took possession, but at the peace of Amiens in 1802, the Colony was ceded to its former possessors. In 1806 it was again taken by the British, and its possession confirmed at the general peace in 1814, since when it has continued to be a part of the British Empire.

Physical features.—The country directly south of the Orange river consists of a series of three terraces divided by mountain ranges varying in elevation from 4,000 (1,219^{m}2) to 8,000 feet (2,438^{m}4),

Charts 2203, 2127, 2483.

and rising gradually in a series of open sterile plains from the river as far as the parallel of lat. 32° 00′ S., whence it gradually declines from north to south ; the culminating point is the Spitzkoss or Compass berg ; the passages from one plateau to another are by well-made passes through the narrow and difficult gorges or kloofs. One of these plateaux is known as the Great Karroo, and is 300 miles in length, east and west, with a breadth of 70 miles ; its chief characteristic is the absence of running water during the greater part of the year, so that during that time it is, as its name implies, a dry barren district, but immediately after heavy rain the whole area is covered by a profuse and varied vegetation. The country to the north is still more elevated and forms part of the great South African plateau. For the most part, the eastern and southern portions of the province receive an abundant water supply, are well wooded, and extremely fertile.

The south-western part of the province produces grain and wine, in the southern part forests exist, and in the south-eastern parts tobacco and maize are cultivated.

The principal mountain ranges are Olifants Zitzikama, the summit of which is Great Winterhoek, 6,818 feet (2,078^{m}1) ; Groote Zwarte bergen, its highest peak being Cockscomb mountain, 5,773 feet (1,759^{m}6) ; and the Roggeveld Sneeux Bergen range, having Compass berg, 8,209 feet (2,502^{m}1), the highest peak in the colony, for its apex.

The rivers, although numerous, are practically useless for either navigation or irrigation, most of them flowing through deep and precipitous ravines, and being, except when swollen by rains, mere shallow torrents. Bars, which front the mouths of the largest, in most cases make entrance both difficult and dangerous, but some of these have been rendered navigable. The principal rivers are the Orange and the Olifants rivers, the former rising near Mont aux Sources, in Basutoland, and draining about 400,000 square miles of country.

Flora.—Fauna.—South Africa is greatly destitute of forest except in the lower valleys and coastal regions. In the plains the fleshy, leafless, contorted species of kapsias, mesembryanthemums, aloes, and other succulent plants are found, and there is also some valuable timber, the trees being yellow pine (*Podocarpus elongatus*), stinkwood (*Ocotea*), sneezewood or Cape ebony (*Pteroxylon utile*), and ironwood. Extensive miniature woods or heaths are found in endless variety, covered throughout the greater part of the year with innumerable blossoms, red being prevalent ; alfa, the most abundant of all the grasses, grows in the plateau of the Atlas range.

The indigenous animals are fast disappearing, but buffaloes are found on the south coast, and the springbok is abundant. The ostrich, the secretary bird, the francolin, and the guinea fowl are common, while the weaver bird is found in the southern part. Amongst reptiles are a number of venomous snakes. The bite of the tsetse fly is fatal to most animals.

Natives.—The Bushmen are the earliest known inhabitants of South Africa. They are of the lowest type of humanity, and frequented the Kalahari desert, Namaqualand, and Damaraland. The few that remain are to be found in Calvinia, Kenhardt, and Namaqualand. They are small in stature, and their life is more that of animals than men. Their language appears to be one of sound rather than articula-

Charts 2095, 2202a, 748a.

tion. Their inveterate enemies were the Hottentots and Bechuanas, who did their best to exterminate them long before the arrival of Europeans.

The Hottentots at one time dominated the country. Their origin is unknown, but they were fully established in the fifteenth century. Their habits were nomadic and pastoral. The pure Hottentots are now nearly extinct.

The Griquas are the result of contact between the Hottentots and the Kaffirs and Boers. They are, though a mixed race, the descendants of the Hottentot line, and retain their tribal organisations. In appearance they are thin and wiry, of medium height, and pale yellow in colour, with high cheek-bones, and flat noses. From their hereditary pastoral temperaments they make good farm servants, etc.

The native population of the eastern districts are the Kaffirs of the Amaxosa tribe, one of the four great tribes which were found by Europeans in 1688 inhabiting the country between the Cape and Natal. The Kaffirs are a fine, tall, muscular, intelligent race, rather of a vain and generally indolent disposition. They are an agricultural and pastoral people, but also manufacture articles in wood, iron, and fibre. Superstitious tales take the place of religion.

Trade.—Produce.—The principal products of the province are minerals, including diamonds, copper, coal, tin, and gold; oats, wool, Kaffir corn, barley, and rye are also produced.

Chart 1691.

ASCENSION ISLAND.—General remarks.—This island, now a Dependency of St. Helena, with an area of 34 square miles, and a population, in 1949, of 159, was discovered on Ascension day, 20th May, 1501, by João de Nova Gallego, a Portuguese, and was visited two years later by Alfonzo d'Albuquerque, who gave to it its present name.

In the year 1815, the British Government deemed it requisite to take possession of the island, and in 1821 it was garrisoned by a company of the Royal Marines.

The first buildings were erected near the present landing place, but there is no doubt that better landing facilities would have been available had a site at Comfortless cove been chosen, though the ground in its vicinity is not suitable for the foundation of a settlement.

Improvements were made, and in 1827 roads, along which water was conveyed to the garrison, were constructed to the several springs. In 1830 the collection of Government buildings and wooden houses was given the name of Georgetown, at which time the garrison consisted of 100 marines and 50 Kroomen from the coast of Africa. By the month of March, 1833, the island had been fortified at all accessible points, and the establishment numbered nearly 300 persons.

In 1922 the garrison was withdrawn and the control of the island, which up till then had been directly under the Admiralty, was transferred to the Colonial Office as a dependency of St. Helena.

At the present time Ascension is an important cable station, and the Manager of the Cable Company acts as Resident Magistrate and has a seat on the Council. Officials of the Company perform such administrative duties as may be necessary.

No person is allowed to land on the island without permission of

Charts 2202a, 2203, 2127, 2483.

Chart 1691.

the Resident Magistrate, nor to reside there without the authority of the Governor of St. Helena.

Physical features.—Climate, etc.—Ascension island is of volcanic origin, but since the time of its discovery no sign of volcanic activity, not even a hot spring, has been reported, though geologically the island is extremely young.

The island obtains its supply of water from catchments, so that it obviously varies with the rainfall, and little can be spared for shipping. Condensers have been erected to guard against the possibility of drought.

The climate is singularly healthy, and the salubrity of the island is attributed to its situation in the heart of the South-East Trade wind and the complete absence of marshy soil.

Flora.—Fauna.—At the agricultural station, the soil produced by the decomposition of the volcanic matter is rich and productive, though only a portion of it is cultivated; and there various kinds of moss, grass, heath, and flowers have been successfully planted, so that the botany of Ascension boasts of about 170 varieties.

Fruits, such as pines, Indian gooseberries, and plantains, have been successfully cultivated; and potatoes, onions, carrots, peas, French beans, and almost every esculent vegetable, have also been produced. The castor-oil plant thrives on Green mountain and crops of Indian corn have been raised.

Horses, mules, cows, sheep, and asses have been imported at various times; the asses now run wild. Cats are numerous, but instead of destroying the rats, they prey on the sea-fowl that frequent the island to lay their eggs. Goats, rats, and land crabs, being enemies to cultivation, are destroyed whenever the opportunity offers, and will probably be ultimately extirpated.

Insects are not troublesome. There are some mosquitoes (Stegomyia) and a few scorpions and centipedes; after heavy rains, crickets abound. A small blue mountain butterfly is sometimes seen.

The indigenous birds include the man-of-war bird, black and white, measuring sometimes as much as 7 feet (2^{m}1) between the tips of its wings, two kinds of gannet, two of petrel, and the boatswain bird. The tropical swallow (*Sterna fuliginosa*) or wide-awake visits the island in great numbers during the laying season, which is irregular and only occurs about three times in two years. Their eggs are considered by some to be a delicacy resembling those of the plover, but though the bird is small, the egg is nearly as large as that of the common fowl.

There is an abundance of excellent fish to be caught among the rocks throughout the year, such as rock-cod, mullet, conger-eel, cavalhoes, etc.; and they are so plentiful that a boat's crew may sometimes catch sufficient to supply the crew of a cruiser. The best place for fishing is on the reef near the anchorage, using at first a piece of salt pork for bait, and afterwards baiting with fish to catch their fellows. Cray-fish are also caught, near the mouths of the caverns among the rocks towards English bay (*Lat. 7° 54′ S., Long. 14° 23′ W.*), by hanging a piece of pork or fish a short distance below the surface of the water at the mouth of the cavern, when they will rise to the bait, and may be taken by hand. Oysters are abundant, but are small, they are of the rock type and are excellent eating.

Turtle.—Ascension is visited by the sea-turtle between Christmas

Charts 2202a, 2203, 2127, 2483.

Chart 1691.

and Midsummer, and it is supposed that during the above period each female makes three or four nests. This animal remains on the coast until 80 to 150 eggs are fit to be deposited in the sand, and then lands on the beach between the hours of 2200 and 0400. She then proceeds sometimes as far as 150 or 200 yards ($137^{m}2$ or $182^{m}9$) above high-water mark, digs a large pit about 8 or 10 feet ($2^{m}4$ or $3^{m}0$) in diameter, and 2 or 3 feet ($0^{m}6$ or $0^{m}9$) deep, in which the eggs are deposited and carefully covered over with sand; the process of incubation being left to nature.

In nine or ten weeks the young turtle breaks its prison, and working its way through the sand, gains the surface and immediately takes to the sea, after which it is never seen again until it is full grown. Should this short journey, however, happen in daylight, many of the young animals are picked up and devoured by the man-of-war birds, who are ever hovering over the turtle nests.

During the height of the season, 50 or 60 turtle may be turned of a night when they come to deposit their eggs in the sand; on such occasions men are stationed during the night in the bays they frequent, to turn them over on their backs, in which position they are perfectly helpless, and are thence transferred to ponds in the town formed for their reception. The turtle when fully matured weighs from 400 to 800 lbs., but it is worthy of remark that no male turtle ever make their appearance on the beach. At times the turtle seem almost to forsake the island, as, for instance, in the season of 1874, when only 65 were taken altogether.

Turtle may be purchased, but the turning of turtle by strangers is strictly prohibited; and any person guilty of a breach of this regulation is subject to a heavy penalty.

Trade.—Produce.—Currency, etc.—*See* St. Helena island.

Chart 1771.

ST. HELENA ISLAND.—General remarks.—There is an abundance of interesting historical and descriptive records concerning St. Helena. The archives of the Administration from 1678 are preserved at the Castle; among them being the original of the instrument "The Laws and Constitution of the Island of St. Helena" issued by Charles II in 1681.

The island, which has an area of about 47 square miles and an estimated civil population of 4,644 in 1949, was discovered in 1502 by João de Nova Castella, Commodore of a Portuguese Squadron returning from India; but the Portuguese made no attempt to colonise it, being content to use it as a place of "refreshment" for their ships.

In 1513 it became the voluntary abode of Fernando Lopez, a Portuguese nobleman, who was being brought back in disgrace from India. The discovery of the island is said to have been kept a secret until Sir Thomas Cavendish, returning from his famous voyage round the world, anchored there in 1588.

In 1645, the Dutch assumed possession of the island, but a few years later abandoned it to establish themselves at the Cape of Good Hope. Their place in St. Helena was taken by the English, and in 1661 the Crown granted to the East India Company a charter for its administration.

According to some accounts the island was recaptured by the Dutch

Charts 2202a, 2203, 2127, 2483.

Chart 1771.

in 1665, who were expelled the same year. They seized it again in 1672, but on the evening of 14th May, 1673, Captain (afterwards Sir Richard) Munden surprised and recaptured the place and it reverted by conquest to the possession of the British Crown.

In December, 1673, a new charter was granted to the East India Company, and, with the exception of the term of Napoleon's exile, the island continued under the Company's administration until 1834, when it was brought under the direct control of the Crown.

St. Helena island is famous in history as the scene of the Emperor Napoleon's exile and death, for it was on the 15th October, 1815, that he arrived in H.M.S. *Northumberland*, and on the 5th May, 1821, that he died in captivity at Longwood. His body was interred in Sane valley, beneath a group of willows, his favourite haunt during his lifetime. It was exhumed, for conveyance to France, on the 15th October, 1840, when the remains appeared almost untouched by the hand of time. The house occupied by the Emperor and the site of his tomb are now in the charge of the French Government, who were granted the freehold in 1858.

The Colony, which consists of the island of St. Helena, with the islands of Ascension, Tristan, Nightingale, Inaccessible and Gough as Dependencies, is administered by a Governor assisted by an executive council.

Physical features.—St. Helena is of volcanic origin, and is believed to date from pre-glacial time, probably pre-pliocene. Limestone is found in different parts of the island, gypsum near Prosperous bay, cornelian in Turk's Cap bay, and honeycombed basalt and red tufa, which afford excellent building material, exist in large quantities. A layer of fossil shells, univalves, has been discovered near Flagstaff hill at an altitude of about 2,000 feet ($609^{m}6$).

Flora.—Fauna.—The botany of St. Helena is interesting, affording nearly 60 species of indigenous trees and plants, including the tallow tree and ferns of great beauty. In the grounds in the vicinity of Plantation house, the oak, eucalyptus, Cape yew, bamboos, aloe, pine, etc., flourish together. A large proportion of the area which until recently was covered with a luxuriant growth of ferns and a variegated assortment of indigenous vegetation has been planted with phornium tenax, the New Zealand flax, from which is obtained the fibre, now the Colony's chief article of export.

On approaching the sea, vegetation gradually disappears, the summits of the hills within 1½ miles of the coast being almost barren, excepting a scanty growth of samphire. In the valleys, however, where water can be procured, the gardens produce an abundance of fruit and vegetables, especially bananas and pumpkins. The island appears favourable to the cultivation of coffee and cotton, particularly in the valleys southward of the main ridge, which are well irrigated and extremely fertile.

The ravines are the resort of numerous coveys of the red-legged partridge, and the pheasant frequents the thick cover on the higher ridges. An indigenous bird resembling the sandlark, with long legs and grey body and wings, called by the islanders the "wire-bird," is also found. Doves, Java sparrows, amaduvades, and canaries inhabit the gardens, the last-mentioned being remarkable for the richness of their tone.

Charts 2202a, 2203, 2127, 2483.

Chart 1771.

The rocky islets round the coast swarm with sea-birds, particularly the beautiful white bird (*Procellaria nivosa*); and the man-of-war bird and tropical birds are to be seen wheeling in their flight high above the lofty pinnacles of the island. Sea-fowl deposit immense quantities of eggs on the island, which in the fall of the year are collected for food. The shores abound with fish, to the extent of about 70 species; among these, mackerel and albacore are peculiarly abundant and form the principal food of the poorer inhabitants; some descriptions of fish are, however, very unwholesome.

Sharks of great size and voracity are now and then captured; and during the month of August schools of whales (black fish) are frequently seen. No snakes or reptiles, except a few centipedes and scorpions, are found on the island. Rats, however, are a terrible plague, and nothing is safe from their depredations. Turtle visit the island, and amongst the shell-fish, oysters and two kinds of lobster are found.

Trade.—Produce.—Currency, etc.—The statistics for the colony of St. Helena show that the chief exports are fibre, tow, and turtles.

The chief product of the island of St. Helena is flax, and there are six private mills in addition to the Government flax-mill. There is also a rope and twine factory. Cattle do well, but there is no outside market for the meat. Bananas of very good quality and flavour are grown, while mangoes, figs, oranges, peaches, and guavas are obtainable at certain seasons. Yams, pumpkins, cabbages, peas, tomatoes and lettuces are raised, but the potato is the principal article of food produced.

During the year 1949, 24 merchant vessels called at St. Helena.

The St. Helena Currency, Coinage and Legal Tender Ordinance No. 5 of 1948, as amended by Ordinance No. 12 of 1949, provided that the Colony's currency should be Bank of England notes and United Kingdom coins which are legal tender in the United Kingdom.

By the Weights and Measures Ordinance, 1905, the weights and measures for the time being lawfully in use in the United Kingdom, and no others, are to be used in the colony.

Chart 1769.

TRISTAN DA CUNHA GROUP.—General remarks.—This group of islands consists of Tristan, Inaccessible, Nightingale, Middle and Stoltenhoff islands; the last three being situated close together. In 1950, the population of Tristan, which is the only inhabited island of the group, was 266.

The group appears to have been discovered by Tristan da Cunha, a native of Portugal, and was named after him in 1506. It was explored and described by the Dutch in 1643, and by the French in 1767. Captain Patten of the American ship *Industry*, and a part of his crew, resided temporarily on Tristan island, engaged in collecting seal skins, from August, 1790, to April, 1791. Captain Heywood, H.M.S. *Nereus*, who visited the island in January, 1811, found three Americans there who then proposed to remain for a few years collecting seal skins and oil for sale to vessels touching at the island. One of these men, Jonathan Lambert by name, by a curious edict, declared himself proprietor of the island on the 4th February, 1811. He cleared a quantity of land and planted various seeds, some of which were supplied to him by the American Minister at Rio de Janeiro. The whole,

Charts 2202a, 2203, 2127, 2483.

Chart 1769.

however, was afterwards abandoned, and formal possession was taken in the name of the British Government on the 14th August, 1816, by a detachment of troops sent from the Cape of Good Hope in the H.M.S. *Falmouth.*

During the incarceration of Napoleon at St. Helena, a detachment of artillery was stationed on Tristan island, and on its withdrawal, in the latter part of 1817, one of the detachment, Corporal William Glass, who died in 1853, and two seamen of the St. Helena squadron, obtained leave to remain on the island. These were joined by men engaged in whaling, shipwrecked mariners, etc., and the present inhabitants are descended from them, though many families have left the island from time to time.

Tristan island was surveyed by Captain Denham, R.N., F.R.S., H.M.S. *Herald*, in 1852; Inaccessible and Nightingale islands were partially surveyed by Captain Nares, R.N., and the officers of H.M.S. *Challenger* in 1873.

By Letters Patent dated 12th January, 1938, Tristan, Nightingale, Inaccessible, and Gough islands were declared to be Dependencies of St. Helena.

In 1942 Tristan was commissioned by the Admiralty as H.M.S. *Atlantic Isle*, and a meteorological and radio station was set up. At the end of the war these stations were taken over by the South African government.

In 1949 the newly formed Tristan Exploration Company established a fishing industry, which is supported by the Colonial Development Corporation. Following upon these developments, a chaplain, a doctor and a nurse now reside upon the island, and in 1948 an officer of the Colonial Service was appointed as Administrator, responsible to the Governor of St. Helena.

Physical features.—The group is of volcanic origin, and the ascent of the peak of Tristan island is easy. This peak terminates in a cone of black and dark-red lava ashes, in the centre of which is a nearly circular extinct crater, about one-quarter of a mile in diameter and partly filled with fresh water, not more than 2 fathoms ($3^{m}7$) in depth. No ancient lava streams are visible, nor are there any signs of former sea levels; no corals or shells have been found, and there are no thermal waters. The only indication of volcanic activity during the residence on the island of Governor Glass was a slight earthquake which occurred about the year 1849.

Health.—Experience shows the island to be moderately healthy, for the inhabitants are subject to few diseases other than mild intestinal complaints, ascariasis, and asthmatic conditions, and epidemic infections such as influenza, introduced by visiting vessels.

Flora.—Fauna.—The islands possess a fairly extensive flora, in which many species of ferns, lichens and mosses are of special interest; about one-fifth of Tristan itself is densely wooded with the island tree, *Phylica Nitida*, resembling a large juniper, in spite of the amount cut for fuel. Many kinds of fruit trees and other plants have been introduced, apples being especially successful. A plant formerly used as a substitute for tea, invariably springs up after a crop of potatoes, which latter is the staple food. A plant carrying edible red berries somewhat resembling insipid cranberries in taste, as well as a wild celery, grows everywhere.

Charts 2202a, 2203, 2127, 2483.

Chart 1769.

Wild cats are said to roam about the cliffs. The islands are visited by right whales, fur seals and sea elephants.

Many sea-birds, including the wandering albatross, visit the group of islands and can be seen, especially at dusk, flocking in vast numbers from all parts of the horizon. The eggs, particularly of the mollymauk, great shearwater and penguin, are collected in large numbers in September to November.

The only land birds are a species of thrush, two species of bunting, and a small flightless rail, though strays such as herons, gallinules, and sandpipers occur sporadically.

There are no reptiles and very few insects.

The island is frequented by mackerel, rock cod, crayfish, and other fish. The blue shark abounds, and the islanders in consequence deem it unsafe to bathe in the sea. About a hundred whales, on an average, are sighted each month from July to October. There are no fresh-water fish on the island.

GOUGH ISLAND.—General remarks.—Gough island (*Lat. 40° 20′ S., Long. 10° 00′ W.*), which is situated in the Southern ocean about 230 miles south-south-eastward of Tristan island, is uninhabited. The island derives its name from Captain Gough, who sighted it in 1731, in the ship *Richmond*, on a voyage to China, but there is reason to suppose that the original discoverers were Portuguese. Captain Heywood visited the island in H.M.S. *Nereus*, in 1811. A running survey of the island was made by H.M.S. *Royalist*, Captain G. W. Hand in January, 1887. It was also visited by the S.S. *Scotia*, in connection with the Scottish National Antarctic Expedition, in April, 1904, and was surveyed by Commander F. A. Worsley, D.S.O., R.N.R., of the R.Y.S. *Quest*, in 1922.

By Letters Patent dated 12th January, 1938, Gough island was declared to be a dependency of St. Helena.

Physical features.—The structure of Gough island can best be described as a monoclinal block with dip slopes to the west and steep escarpments to the east. On the eastern side, the escarpments are cut by three or four V-shaped valleys, the largest, about the middle of the east side, giving access to the interior. The most striking feature looking up this glen is the great stock of an acid intrusive rock which rises to 2,270 feet (691^{m}9) in splintered pinnacles.

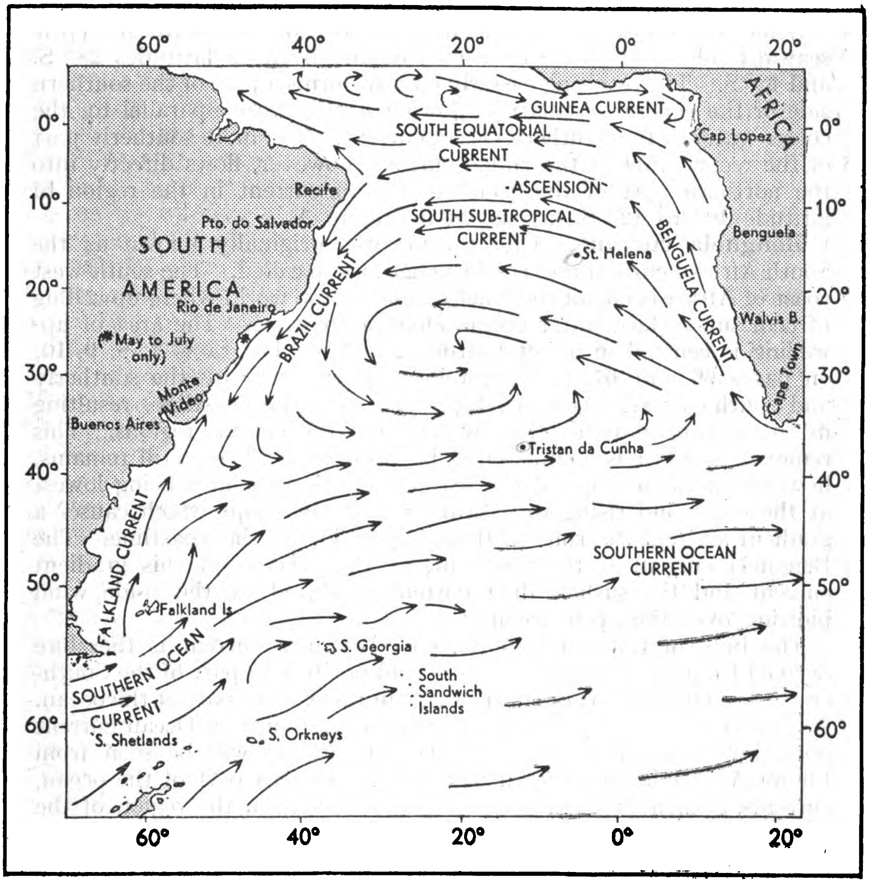
The chief country rock is basaltic with considerable variation in texture. Marvellous doleritic dykes cut the basalts. They are very resistant and stand up prominently, their cross-columnar structure being a special feature.

Flora.—Fauna.—The island is covered with vegetation during the summer months, and is a naturalist's paradise. Tussock grass and a small stunted tree (*Phylica Nitida*) both grow in abundance, even in the most exposed places. Ferns and mosses are luxuriant near the numerous waterfalls and along the banks of the streams; but the southern slopes appear more fertile than the northern which latter are rocky and barren. The coasts are fringed with kelp, though it does not grow quickly. Penguins and other seabirds abound, also finches and water-hens. A few insects have been seen and mice overrun the ruins at Glen anchorage.

Charts 2202a, 2203, 2127, 2483.

Charts 2202a, 5310.

CURRENTS.—General remarks.—The general surface current circulation of the South Atlantic Ocean is anticlockwise, as shown in Figure A. The relatively cool Benguela current forms the eastern side of this circulation; this passes into the warm westerly currents which form the northern part of the circulation. Of these the South Equatorial current extends in latitude from a little north of the equator to 6° S. South of latitude 6° S. there is a considerable reduction in the average strength of the westerly current, which is known as the South Sub-Tropical current. The western side of the circulation is formed by the Brazil current, which is mainly derived from the warm waters of the South Sub-Tropical current; the bulk of the water of the South Equatorial current flows along the north coast of Brazil and across the equator to join the North Equatorial current and so continues towards the Caribbean sea as part of the general circulation of the North Atlantic Ocean.



General Surface Current circulation: South Atlantic Ocean.

Fig. A.

Charts 2203, 2127, 2483.

The southern part of the circulation is mainly formed by the Southern Ocean current, which flows all round the globe southward of the South Atlantic, South Indian and South Pacific oceans. This current is restricted in width by passing through Drake passage, between Cape Horn and Graham land. Eastward of this passage it widens very much, its northern part fanning out north-eastward past the Falkland islands to reach to about the 38th parallel in the middle longitudes of the South Atlantic.

Some water also recurves south-eastward and eastward from the seaward side of the Brazil current, mainly between latitudes 28° S. and 42° S. The resulting easterly current forms a part of the southern side of the general circulation, flowing north of, and parallel to, the colder water of the Southern Ocean current. The more southerly part of the recurvature of the Brazil current, however, flows directly into the northern part of the Southern Ocean current in the region of latitude 40° to 42° S., as shown in Figure A.

Benguela current.—This current was originally known as the South African current and is still sometimes so called. The south-west coast of Africa is one of the chief regions of the world where upwelling of cool sub-surface water occurs along a coastline. The area of upwelling is centred in about latitude 26° S., *see* Diagrams 7, 8, 9, 10, on pages 66 and 67. The upwelling is produced by the southerly and south-easterly trade wind blowing over the coastline, resulting in the continued removal of water from the coastal regions. This removal of water is compensated by upwelling. There still remains, however, a slight slope of the sea surface, the sea level being lowest at the coast and rising to seaward. It is this slope which causes a gradient current to run northward parallel to the coastline. The Benguela current is the resultant, at the surface, of this gradient current and the surface drift current produced by the trade wind blowing over the open ocean.

The bulk of the water of the cool Benguela current is therefore derived from local subsurface water and not from a part of the Southern Ocean current turning northwards in the eastern part of the ocean. A relatively small amount of water from the Southern Ocean current does, however, enter the Benguela current. It will be seen from Figure A that in the eastern half of the southern part of the ocean, currents branch in a north-easterly direction from the region of the Southern Ocean current; these converge with the north-westerly current flowing further northward; towards the South African coast a part of the north-easterly flow contributes to the beginning of the Benguela current.

Another minor source of Benguela current water is a small part of the warm water of the Agulhas current of the South Indian ocean which rounds the Cape and so passes into the Benguela current. The warm water usually fills False bay, but during long north-westerly gales it is occasionally driven out and replaced by cooler water from the South Atlantic. The Agulhas current water seldom reaches Table bay, the water of which is normally much colder than that in False bay.

The remarks which follow refer to the main, or oceanic, part of the Benguela current, through which the shipping route to the Cape runs. This part of the current, starting from the Cape, has a general north-westerly direction and extends to near the coastal region only as far northward as about latitude 25° S., where it leaves the coast. It is more constant throughout the year as a whole than the remaining part of the Benguela current, which sets in a direction varying from north to north-west along the coast from about latitude 25° S., to Cap Lopez, in the region of the equator. This part of the current is described under Coastal current, below.

While it is broadly true that the Benguela current extends to near the coastal region south of latitude 25° N., currents in other directions, including onshore sets, may be met close to the coast, *see* page 302.

A special feature of the Benguela current is the way in which water fans off from its seaward side in north-north-westerly and westerly directions, throughout its whole extent of latitude. Between latitudes 22° S. and 6° S., these extensions pass into the South Sub-Tropical current. As shown in Figure A, the most southerly part of this west-going water converges with north-east and north-going water from the Southern Ocean current. This region, between latitudes 30° and 35° S., extending westward to about longitude 20° W., is known as the South Sub-Tropical convergence; in this part of the ocean water sinks below the surface.

The following remarks on constancy and strength of current are based on observations received during the period 1855 to 1939. The Benguela current, from its origin in about latitude 34° S. to latitude 6° S., where the main part of it passes into the South Equatorial current, has a considerable degree of variability, depending on changes in wind direction and strength. In this respect it resembles the currents of the other trade wind areas of the globe. On the main shipping route to the Cape more than half of all currents experienced set in directions between north-north-west and west. The remainder of the currents reported comprise those in every other direction. Further westward, where the Benguela current is fanning out, the majority of the sets experienced are between north-west and south-west; all other directions may also be met with here.

The average rate of currents experienced varies a little with latitude and season; it is mainly between 10 and 12 miles per day. The great majority of the currents do not exceed the rate of 1 knot and no current exceeding 2 knots has been reported.

In the region of latitude 34° to 36° S., longitude 14° to 20° E., the currents are stronger, during the nine months November to July. In November to April from one-third to one-half of the currents observed exceed the rate of 1 knot, and in November to July an occasional current exceeding 2 knots has been reported. In this region currents setting in any direction may be experienced. In August to April the majority set between north-north-west and south-west; in May to July the numbers of currents with west and east components are approximately equal.

The Coastal current.—From the region of latitude 25° S., a part of the Benguela current flows in a general direction northward along the coast, covering also the ocean between the main part of the Benguela current, trending seaward, and the coast. The following remarks refer to the course of the current as far as the region of the equator. The branch which proceeds further northward into the Bight of Biafra is described later.

The trade wind over the region of this part of the Benguela current

Charts 2202a, 5310.

blows from a more southerly direction than that over the main part of the current further westward and the average strength of the wind is less. In consequence the current is more variable and irregular, both in rate and direction, than the main Benguela current. Local winds affect the current and in general the actual current experienced at any time may set in any direction, including southerly ones, at all seasons. Near the coast, onshore currents may be met in various regions; these are referred to in the body of the work.

The number of observations available for this part of the current is much fewer than in the main part of the Benguela current. They do, however, indicate that a more general and predominant flow to the northward or north-westward takes place in February to July than during August to January, when more variability may be expected, especially in the region between the Congo estuary and Walvis bay. Northward of the Congo estuary the current is in general more constant throughout the year, being strengthened by the mingling with it of the Congo stream; the combined current runs almost constantly in a north-westward or north-north-westward direction, sometimes maintaining a rate of as much as 2 knots as far as Cap Lopez.

The direct stream from the Congo is felt at a considerable distance from the coast, and imparts a clayey appearance to the water, which is of a yellowish olive-green colour. The junction of this stream with the Benguela current is most marked off Ponta da Moita Sêca, the southern point of the Congo estuary. At a distance of 9 miles offshore the water is still quite fresh; at the distance of 40 miles it is only partially mingled with that of the sea. Both the discoloration caused by the fresh water, and the river current, have been reported to be perceptible 300 miles offshore, so that vessels going northward or southward should be prepared to make allowance for this set. For further information about the Congo stream, *see* page 176.

Southward of the Congo river few of the currents observed in the open ocean exceed 1 knot. Near the coast, however, stronger currents may at times be experienced. Thus close inshore between Cape St. Martin (*Lat. 32° 43′ S., Long. 17° 55′ E.*) and Orange river a current has been found setting south-westerly at the rate of 40 miles a day.

Bight of Biafra.—The bulk of that portion of the Benguela current which reaches the vicinity of Cap Lopez turns westward and passes into the South Equatorial current, between the equator and latitude 2° or 3° S.; the remainder, after passing Cap Lopez, sets towards Cabo San Juan (*Lat. 1° 10′ N., Long. 9° 21′ E.*) and thence following the sinuosities of the coast, continues as far as Rivière Cameroun, where it mingles with the Guinea current flowing eastward along the coast of the Gulf of Guinea into the Bight of Biafra. Though this is the general trend of the current it is variable, being greatly influenced by the direction, strength and duration of the wind. From January to April, the current appears occasionally to run southward, close inshore, between Rivière Cameroun and the Equator. On rare occasions no current is experienced along the coast between Cap Lopez and Rivière Gabon for several days together.

The Bight of Biafra thus receives an accession of water from both westward and southward; the excess water must therefore emerge from the bight. Observations of current in the coastal regions of the bight are scanty and the open waters of the bight and in the ocean

Charts 2203, 2127, 2483.

westward of it to long. 2° W. no observations are available. The excess of water must emerge in southerly and south-westerly directions and pass into the South Equatorial current, but much of the outflow may be below the surface, the more saline water of the Guinea current sinking below the less saline water of that part of the Benguela current which sets northward into the bight. A small arrow is shown in Figure A connecting the Guinea and the South Equatorial currents, but how far such a definite surface flow exists, and its precise position, is not yet known.

The following remarks briefly summarise information given in the body of the work under the appropriate localities. The Guinea current impinges on the island of Fernando Póo. Isla de Annobon is within the flow of the South Equatorial current, while Ilha de São Tomé is sometimes within the course of the same current. The flow of the Guinea current normally extends as far southward as lat. 1° 30′ N., westward of about long. 6° E.

South Equatorial Current.—The following remarks refer to the oceanic part of the course of this current eastward of Cabo de S. Roque (*Lat. 5° 29′ S., Long. 35° 15′ W.*). This is one of the most constant currents of the world and the bulk of the currents experienced set in directions between north-west and south-west, the majority of these being between west-north-west and west-south-west. These remarks apply to that part of the current which lies between the equator and lat. 6° S. Nevertheless occasional currents may occur setting in all other directions. The average strength of the current varies in different seasons and in different parts of the region during the same season, being as follows, in miles per day :—

November to January	14 to 21	May to July . .	16 to 26
February to April .	13 to 22	August to October .	13 to 23

A considerable proportion of all the currents with westerly components exceed the rate of 1 knot ; very few of the others do so. Occasional currents exceeding 2 knots have been reported in all months except February to April ; these are most frequent in May to July, when the current is strongest.

The part of the South Equatorial current which lies north of the equator is less strong and less constant. The northward limit of the current, which is the southern boundary of the Equatorial counter-current and the Guinea current, varies in different longitudes and at different seasons, *see* Africa Pilot, Volume I.

South Sub-Tropical current.—This part of the westerly flow lies between lats. 6° S. and about 22° S. It has no definite southern boundary as it merges into the region of the South Sub-Tropical convergence, referred to above. The current is less constant than the South Equatorial current and the proportion of currents with rates exceeding 1 knot is smaller. Between lats. 6° and 12° S. an occasional observation of a current exceeding 2 knots has been reported during the months of May to October. The average strength varies in different parts of the current and in different seasons, from 9 to 19 miles per day, the most frequent values being from 12 to 14 miles per day.

Guinea Current.—For a full account of the east-going Equatorial countercurrent, and its extension the Guinea current, *see* Africa Pilot, Volume I. The remarks which follow refer to the Guinea current on its

Charts 2202a, 5310.

easterly course from Cape Palmas (*Lat. 4° 22′ N., Long. 7° 44′ W.*) into the Bight of Biafra.

The Guinea current is strong, and from Cape Palmas to long. 2° E. its strength and constancy are both high. From thence to the Bight of Biafra, it is less strong and more variable. The average strength of the current in miles per day is given in the following table:—

	Cape Palmas to long. 6° W.	Longs. 6° W. to 2° W.	Longs. 2° W. to 2° E.	Eastward of long. 2° E.
November to January	24	23	22	15
February to April .	26	26	18	17
May to July . . .	33	45	24	20
August to October .	30	23	19	19

Between Cape Palmas and long. 2° E., during August to April, a considerable proportion of all currents observed have a rate of between 1 and 2 knots and currents exceeding 2 knots are not infrequent. In May to July when the current is strongest, a considerable proportion of the currents in this region have a rate of between 2 and 3 knots, and currents exceeding 3 knots are not infrequent.

Eastward of long. 2° E. currents with a rate of between 1 and 2 knots are not infrequent throughout the year; these may be easterly sets or westerly ones. No current exceeding 2 knots has been reported in this region.

Southern Ocean current.—This current, in most parts of its course around the globe, is not a well-defined or constant one. It is influenced by the wind blowing at the time, or lately prevailing, and is therefore a region of variable current with some predominance of sets having an easterly component. Currents setting in any direction may therefore be experienced at any time and westerly sets are not infrequent.

Chart 2202a.

TIDAL STREAMS.—Along the coast covered by this volume the tide is semi-diurnal with two high waters and two low waters a day. The range of the tide is comparatively small, only exceeding 6 feet ($1^{m}8$) at mean springs in a few of the river estuaries and even in them it does not exceed 9 feet ($2^{m}7$). The time of high water at places on the coast gets slightly earlier as one proceeds southward, but the time differences (except for places well up the rivers) are small. High water at Bonny bar (River Niger Delta), for example, is only about an hour later than that at Cape Town.

Because of the small range of tide and of the small differences in the time of high, and of low, water, the tidal streams along the coast generally are very slight; except near the river estuaries and a few large and shallow indentations in the coast the tidal streams are completely negligible compared with the currents, described in the preceding section, *see* pages 29 to 34, and with the drift currents set up by the wind.

The tidal streams may, however, become just perceptible in shallow bays when the weather is very calm.

In some of the river entrances, tidal streams up to 2 or 3 knots, at

Charts 2203, 2127, 2483.

Chart 2202a.

springs, occur; owing to the effect of the river streams, especially in the rainy season, the in-going flood stream is usually weaker and in shorter duration than the out-going ebb stream. In fact, during the rainy season, the in-going stream may be hardly perceptible, being reduced to a few hours of slack water, while the out-going stream may run for 8 to 10 hours and attain a rate of 4 or 5 knots.

The tidal streams are appreciable for distances of 5 to 10 miles from the mouths of the larger rivers, setting toward the river mouth while the tide is rising and away from it while it is falling.

It has been observed that the tidal stream changes near the bottom some time before it changes at the surface, in several localities.

ROLLERS.—These phenomena are experienced with greater or lesser severity along the whole of the south-western coast of Africa especially at, or immediately after, the periods of full and change of the moon, and particularly between the months of April and September, though they may occur at all times of the year.

Between Pointe Souelaba and Cap Lopez, however, the surf is not always continuous, for northward of Isla Corisco, during fine weather, there is often not a ripple on the beach; and though southward of that bay the surf on the open beaches is heavier, landing is sometimes comparatively easy; nevertheless, for a day or two after the full and change of the moon, the swell rises, and the surf breaks, irrespective of the weather.

At these times, especially from July to September, a very heavy swell sometimes sets in along the whole coast between the parallels of 3° 00′ S. and 15° 00′ S., and renders it dangerous to remain at anchor in open bays where the water is shallow. On such occasions, it is generally calm, and the force of wind never exceeds a light breeze; thus a steam vessel can readily shift berth and a sailing vessel easily warp outside the heavy rollers by means of a small hawser. It is better to ride with a kedge anchor and hawser, as a chain cable would be liable to snap.

During the season of the rollers, landing on the coast can only be effected by surf boats. Vessels should avoid anchoring (especially at the time of full and change of the moon) in shoal water; if they do so, they should be prepared to get away on the first indication of danger. The approach of the rollers is announced by considerable surf on the beach; the sea breaks on the headlands of the bays before any swell is perceived inside; whilst from the masthead there may be seen large waves in the offing, like ridges on the surface of the water.

Along the whole coast, excepting in bays sheltered from wind and swell, communication with the shore is always very difficult, and frequently impracticable for ships' boats, on account of the heavy surf breaking on the beach.

As a rule, vessels should not anchor on the open coasts in less than 7 fathoms ($12^{m}8$), nor off Ponta do Padrão (*Lat. 6° 04′ S., Long. 12° 20′ E.*), *see* page 195, in less than 10 fathoms ($18^{m}3$), on account of the swell, the undulation of which often assumes a very angry appearance when in a less depth; the swell gets up without warning, and is heaviest during the months of the southern winter, and at the full and change of the moon.

The rollers along the coast of Angola, though very troublesome

Charts 2203, 2127, 2483.

Chart 2202a.

in open bays, are not dangerous to vessels riding with a long scope of cable; but in order to avoid the disagreeable rolling which invariably ensues, it is better if possible to stand out into the offing as soon as they commence.

On the coast of South-West Africa the rollers frequently set in from west-south-westward with great fury, and there is almost always a tremendously heavy swell thundering upon the shores; it is advisable, therefore, to give the land a good berth, except in making the harbours. This remarkable swell renders it very unpleasant for sailing vessels in calms, which often prevail during the night.

On the western coast of the Province of Cape of Good Hope, even in calm weather, there is always a swell, generally from south-westward, which keeps up a constant surf; the effect of this swell acts as an indraught, against which vessels should carefully guard, and the position of a sailing ship becalmed close inshore is attended with danger. It has been ascertained by actual experiment that, during a calm, vessels have been set towards the coast by the swell at the rate of half a knot.

The rollers at Ascension and St. Helena islands break with great violence on their lee sides, and arrive without any apparent warning. Their origin has been the subject of much discussion, and the general conclusion arrived at appears to be that these huge ocean ripples are the progressive undulations caused by distant storms, in the Atlantic oceans of either hemisphere. It is stated that the heaviest rollers occur in the months of December, January, July, and August, and that the clear or muddy appearance of the water is a sure sign of the subsidence or rising, respectively, of the rollers.

The rollers at Ascension island are thus described by Mr. W. H. B. Webster, Surgeon of H.M.S. *Chanticleer*, 1829.

"One of the most interesting phenomena at Ascension are the rollers; in other words, a heavy swell producing a high surf on the leeward coast of the island, occurring without any apparent cause. All is tranquil in the distance, the sea breeze scarcely ripples the surface of the water, when a high swelling wave is suddenly observed rolling towards the island. At first it appears to move slowly forward, till at length it breaks on the outer reefs. The swell then increases, wave urges on wave, until it reaches the beach, where it bursts with tremendous fury.

"The rollers now set in and augment in violence, until they attain a terrific and awful grandeur, affording a magnificent sight to the spectator, and one I have witnessed with mingled emotions of terror and delight. A towering sea rolls forward on the island, like a vast ridge of waters threatening, as it were, to envelop it; pile upon pile succeeds with resistless force, until, meeting with the rushing off-set from the shore beneath, they rise like a wall, and are dashed with impetuous fury on the long line of the coast, producing a stunning noise.

"The beach is now mantled over with foam, the waters sweep over the plain, and the very houses at the town are shaken by the fury of the waves. But the principal beauty of the scene consists in the continuous ridge of water crested on its summit with foam and spray; for as the wind is off the land, the over-arching top of the roller meets resistance, and is carried, as it were, back against the curl of the swell; and thus it plays elegantly above it, as it rolls furiously onward,

Charts 2203, 2127, 2483.

Chart 2202a.

graceful as a bending plume; while, to add more to its beauty, the sunbeams are reflected from it in all the varied tints of the rainbow.

"Amid the tranquillity that prevails around, it is a matter of speculation to account for this commotion of the waters, as great as if the most awful tempest had swept the surface of the ocean. It occurs in situations where no such swell would be expected, in sheltered bays, and where the wind never reaches the shore. The strong and well-built jetty (*Lat. 7° 55′ S., Long. 14° 24′ E.*) of the town has once been washed away by the rollers, which sometimes make a complete breach over it, although it is 20 feet (6^{m}1) above high water mark. On these occasions, the crane at its extremity is turned round in various directions, as the weathercock is turned by the wind, and landing becomes impracticable for two or three days together.

"Such are the rollers of the Ascension, and like unto them are those of St. Helena and Fernando Noronha (*Lat. 3° 50′ S., Long. 32° 25′ W.*). The season at which the heaviest rollers prevail is from December to April, not but what they do occur at other periods, and they have been felt severely in July. Vessels in the bay are perfectly secure, and they have to apprehend no danger unless within the immediate influence of the breakers. Not only are the seasons of the rollers the same at St. Helena and Ascension, but they sometimes are simultaneous in occurrence.

"The rollers occur in the most tranquil seasons of the year, when the South-East Trade wind is often very light, where the vast volume of water is constantly impelled in one direction. There is then a tendency to a back set, or a rush of water in a contrary direction, and a tumultuous swell is produced wherever it meets with the resistance from the islands and the banks on which they are based, as well as the shores of the continent. The long steep beaches of Ascension are admirably adapted for the full display of the effect which has just been described."

Chart 1241.

ICE.—Between longitudes 20° W. and 40° E., icebergs are rarely met with north of about latitude 39° S. Throughout the year, between longitudes 10° E. and 40° E. the extreme limit of bergs fluctuates only between latitudes 39° and 41° S. Between longitudes 20° W. and 10° E., the limit varies more in latitude during the year and in any given season does not run parallel with the circles of latitude. The most northerly position of the limit is in about latitude 38½° S., between longitudes 0° and 10° E., in August and September; the most southerly is in about latitude 48° S., between longitudes 0° and 10° W., in May and June.

By the extreme limit is meant the line beyond which icebergs have only been reported on rare occasions. Small pieces of ice, the residue of bergs, may be met with in positions northward of this limit, but observations of such ice in these exceptional positions have been very rare since 1885.

The mean limit of icebergs between longitudes 20° W. and 40° E. lies furthest north in October to December, when it is between latitudes 43° and 46° S. It is, in general, furthest south in February to June, particularly between longitudes 10° W. and 10° E., where it lies between latitudes 53° and 55° S.

Charts 748a, 2203, 2127, 2483.

Chart 1241.

The extreme limit of pack-ice, between longitudes 20° W. and 40° E., attains its most northerly latitude in August to December, when it lies mainly between 53° and 55° S.

Chart 2202a.

SIGNALS.—Vessels inconvenienced by searchlights.—In the event of the navigation of a vessel being inconvenienced by the glare from searchlights near a port in the British Empire, she should make the International Code signal ZO (— — •• — — —) by lamp and by whistle, siren or fog horn.

Both the light and sound signals should be employed, whenever possible, and should be repeated until the inconvenience is removed.

Only real urgency should necessitate the use of this signal, as, unless the vessel be actually in the rays of a searchlight, it is not possible for the operators to know which projector is affected.

This signal is designed to assist mariners; no liability whatever will be admitted.

This signal should also be used in similar circumstances near ports in other countries.

Lloyd's reports.—Reports can be transmitted through Lloyd's by the signal station at Cape point (Cape of Good Hope). *See* page 317.

Immigration flag.—A yellow flag having a black ball in its centre has been adopted as the Immigration flag at all ports in the Province of Cape of Good Hope. This flag, hoisted at the stay by a vessel arriving in port, denotes that the examination of passengers by the Immigration Officer is being carried out, and that no person, unless provided with a permit or duly authorised by the Immigration Office, is, under penalty, allowed on board that vessel.

Signals to be displayed by vessels carrying explosives or inflammable liquids.—*See* page 46.

LIFE-SAVING.—A rocket apparatus is maintained at: Walvis bay; Lüderitz bay; Port Nolloth; Cape Columbine; Robben island; the docks and castle at Cape Town; Slangkop point; Cape point, Cape of Good Hope; Simonstown.

CAUTIONS.—Landmarks.—With respect to the descriptions in this work concerning trees, many of which date from surveys of 1825 onwards, and the shape and colour of buildings, etc., caution should be exercised, for many new buildings may have been erected and old trees destroyed, so that such marks, which may at one time have been conspicuous on account of their isolation, shape, or colour, may no longer exist or now be difficult to distinguish.

Abnormal refraction.—Extraordinary refraction occurs at times near the coast, especially near the coast of South-West Africa, which may be sufficient to produce mirage. This refraction is likely to cause errors when taking sights.

LOCAL MAGNETIC ANOMALY.—Local Magnetic Anomalies have been reported off Cap Cameroun (page 120); in the vicinity of Ponta das Palmeirinhas (page 224); in an area about 280 miles westward of Walvis bay (page 253); near Slangkop (page 315), and off the Cape peninsula (page 306).

Charts 2203, 2127, 2483.

Chart 2202a.

AIR LIGHTS.—Mariners are warned that lights (with definite characteristics), which are not ordinary navigational aids, may be exhibited for the use of aircraft from structures near the coasts described in this volume.

These lights are often of great luminous power and altitude and may be the first lights or looms of light sighted when making a landfall at night; they normally have the following characteristics:—

(*a*) *Flashing white* (revolving beam type).

(These lights are usually screened from seaward but their looms may be visible.)

or (*b*) *Alternating flashing white and green* (revolving beam type).

or (*c*) *Flashing two-letter groups* in the Morse Code, in *red* or *green.*

(Although the groups made by these lights may have definite meanings in the International Code of Signals, their signification is to be disregarded; the fact that they are *red* or *green* in colour, and flash with mechanical regularity, should prevent their being mistaken for signals from shore signal stations or ships.)

Air lights which appear likely to be visible from seaward will be shown on charts and described in the Admiralty Lists of Lights. As they are subject to changes of which prompt notification to the mariner may not always be possible, care should be taken that they are not confused with marine navigational aids.

SUBMARINE CABLES.—The following Articles are taken from the International Convention for the protection of Submarine Telegraph cables, of 14th March, 1884.

II. It is a punishable offence to break or injure a submarine cable, wilfully or by culpable negligence, in such manner as might interrupt or obstruct telegraphic communication, either wholly or partially, such punishment being without prejudice to any civil action for damages.

This provision does not apply to cases where those who break or injure a cable do so with the lawful object of saving their lives or their ship, after they have taken every necessary precaution to avoid so breaking or injuring the cable.

V. Vessels engaged in laying or repairing submarine cables shall conform to the regulations as to signals which have been, or may be, adopted by mutual agreement among the High Contracting Parties, with the view of preventing collisions at sea.

When a ship engaged in repairing a cable exhibits the said signals, other vessels which see them, or are able to see them, shall withdraw to or keep beyond a distance of one nautical mile at least from the ship in question, so as not to interfere with her operations.

Fishing gear and nets shall be kept at the same distance.

Nevertheless, fishing-vessels which see, or are able to see, a telegraph-ship exhibiting the said signals, shall be allowed a period of twenty-four hours at most within which to obey the notice so given, during which time they shall not be interfered with in any way.

The operations of the telegraph-ship shall be completed as quickly as possible.

VI. Vessels which see, or are able to see, the buoys showing the position of a cable when the latter is being laid, is out of order, or is broken, shall keep beyond a distance of one-quarter of a nautical mile at least from the said buoys.

Charts 2203, 2127, 2483.

Fishing nets and gear shall be kept at the same distance.

VII. Owners of ships or vessels who can prove that they have sacrificed an anchor, a net, or other fishing gear in order to avoid injuring a submarine cable, shall receive compensation from the owner of the cable.

In order to establish a claim to such compensation, a statement, supported by the evidence of the crew, should, whenever possible, be drawn up immediately after the occurrence ; and the master must, within twenty-four hours after his return to or next putting into port, make a declaration to the proper authorities.

The latter shall communicate the information to the Consular authorities of the country to which the owner of the cable belongs.

Caution.—Cautionary Notes appear on many charts, calling attention to areas in which there are submarine telegraph cables ; these areas are indicated by pecked lines on the charts.

Every care should be taken to avoid anchoring in such areas, even though there may be no specific prohibition against doing so, in view of the serious interference with communications which results from damage to submarine cables.

Equal care should be taken wherever the symbol for a submarine cable (a wavy line) is shown on a chart.

Danger involved in cutting a submarine cable to clear anchors or fishing gear.—In the event of any vessel fouling a submarine cable, every effort should be made to clear the anchor or gear by normal methods ; should these efforts fail, the anchor or gear should be slipped and abandoned *without attempting to cut the cable. High voltages are, or may be, fed into certain submarine cables ; serious risk exists of loss of life due to electric shock, or at least of severe burns, if any attempt to cut the cable is made.* No claim in respect of injury or damage sustained through such interference with a submarine cable will be entertained.

Compensation for anchors or fishing gear sacrificed in order to avoid injuring a submarine cable can be claimed under the Submarine Telegraph Act of 1885 (Schedule of Submarine Telegraphs Convention, Article VII).

BUOYAGE.—General Caution.—Owing to changes in channels and shoals, the positions of the buoys require alteration from time to time, and those exposed to the sea, the influence of tidal streams, or the freshets and floods of the rivers, frequently break adrift. A buoy which has drifted from its moorings may seriously mislead, if assumed as being in position.

General description of "Lateral" and "Cardinal" Systems.—There are two uniform systems of buoyage in use, the "lateral" and the "cardinal" systems. They may be used simultaneously, and if so used the transition from one system to the other is indicated by a mark painted red and white or black and white in diagonal stripes, with topmark consisting of a cross and two horizontal bars, painted red or black. In cases where no doubt is possible, transition may be indicated by topmarks as described above added to the limiting marks of the two systems.

See diagrams facing pages 42 and 43.

Lateral system.—This system is generally used for marking well-

Chart 2202a.

defined fairways. The term "starboard hand" denotes that side which would be on the right hand of the mariner either going with the main flood tidal stream or approaching or entering a harbour, river or estuary from seaward. The term "port hand" denotes the left hand of the mariner in the same circumstances.

Starboard-hand marks are conical, and are painted black, or black and white in chequers.

Starboard-hand topmarks, if any, consist of black cones, or for purposes of differentiation, except at the entrance to a channel, of black diamonds.

Lights on starboard-hand marks, if any, consist of *white flashing* or *white occulting* lights exhibiting *one, three* or *five* flashes or eclipses; or *green* lights with a character different from those allocated to wreck-marks.

Port-hand marks are can-shaped and are painted red or red and white in chequers.

Port-hand topmarks, if any, consist of red cans, or for purposes of differentiation, except at the entrance to a channel, of red **T**'s.

Lights on port-hand marks, if any, consist of *red flashing* or *red occulting* lights exhibiting *any number* of flashes or eclipses *up to four,* or *white flashing* or *white occulting* lights, exhibiting *two, four,* or *six* flashes or eclipses.

The ends of middle grounds are marked by spherical buoys, which are painted in horizontal bands, red and white where the main channel is on the starboard hand, or the channels are of equal importance, and black and white where the main channel is on the port hand.

Middle-ground topmarks, if any, when the main channel is on the starboard hand, consist of red cans on the outer marks and red **T**'s on the inner marks. When the main channel is on the port hand the topmarks, if any, consist of black cones on the outer marks and black diamonds on the inner marks. When the channels are of equal importance the topmarks, if any, consist of red globes on the outer marks and red St. George's crosses on the inner marks.

Lights on middle-ground marks, if any, will, as far as possible, be distinctive, and neither colour nor rhythm will be such as to lead to uncertainty as to the side on which the marks should be passed.

Mid-channel marks are of distinctive shapes different from the principal characteristic shapes (conical, can and spherical). They are painted in vertical stripes either black and white or red and white.

Mid-channel topmarks, if any, are of distinctive shapes other than cone, can or globe.

Lights on mid-channel marks, if any, are different from the neighbouring lights at the sides of the channel.

Isolated danger marks are spherical and painted black and red in wide horizontal bands separated by a narrow white band.

Isolated danger topmarks, if any, consist of a globe painted black or red, or half black and half red horizontally.

Lights on isolated danger marks, if any, are *flashing,* either *white* or *red.*

Fairway marks which serve to indicate the seaward approach to a harbour, river or estuary are similar in shape and colour to mid-channel marks, *see* above.

Lights on fairway charts, if any, are *flashing.*

Charts 2203, 2127, 2483.

Chart 2202a.

Buoys on the same side of a channel, estuary or tide-way, may be distinguished from each other by names, numbers or letters.

Cardinal system.—This system is used along coasts which are fringed with reefs or isolated dangers. The marks vary in character according to the quadrant of the true compass in which they are situated with reference to the danger which they mark.

For this purpose the true compass card is divided into four quadrants, called North, East, South, and West, which are bounded by the bearings north-east, south-east, south-west, and north-west from the danger point.

The quadrant in which the mark lies can be identified by the characteristics of the mark as follows:—

North quadrant.—The buoys are conical, painted black with a wide, white horizontal band in the middle and are surmounted by two cones points up.

Lights, if any, are preferably *white quick-flashing* or else *white flashing* or *white occulting* exhibiting an *odd* number of *flashes* or *eclipses.*

East quadrant.—The buoys are conical, painted the upper part red and the lower part white, and are surmounted by two cones bases together.

Lights, if any, are preferably *red quick-flashing,* or else *red flashing* or *red occulting,* exhibiting an *odd* number of *flashes* or *eclipses.*

South quadrant.—The buoys are can-shaped, painted red with a wide, white horizontal band in the middle, and are surmounted by two cones points down.

Lights, if any, are preferably *red flashing* exhibiting an *even* number of *flashes,* or else *red occulting* exhibiting an *even* number of eclipses.

West quadrant.—The buoys can- or spindle-shaped, painted the upper part black and the lower part white, and are surmounted by two cones points together.

Lights, if any, are preferably *white flashing* exhibiting an *even* number of *flashes,* or else *white occulting* exhibiting an *even* number of *eclipses.*

Isolated danger marks and fairway marks are the same as in the lateral system.

Wreck-marking.—Wrecks may be marked either by the lateral or by the cardinal system.

Green is the predominant colour used for all purposes connected with wreck-marking, viz.:—For vessels, buoys, daymarks, lights, etc. Vessels and buoys have the letter **W** and the word " wreck " in the language of the country under whose authority they lie, painted on them in white letters.

Lateral system.—

Wreck-marking buoys:—

(*a*) To be passed on the mariner's port hand—

A can-shaped buoy, and, if lighted, exhibiting a *green flashing* light showing *two flashes.*

(*b*) To be passed on the mariner's starboard hand—

A conical buoy, and, if lighted, exhibiting a *green flashing* light showing *three* flashes.

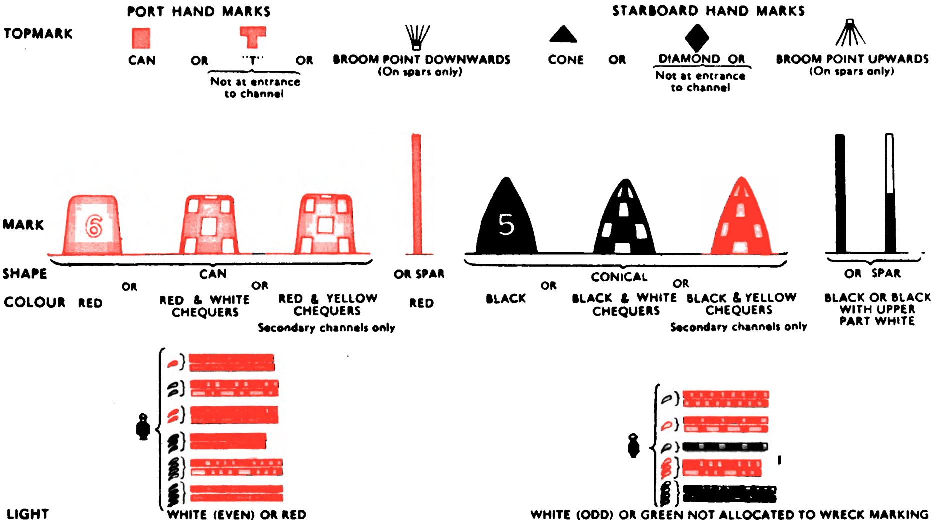
(*c*) To be passed on either side—

A spherical buoy, and, if lighted, exhibiting a *green occulting* light showing *one* eclipse.

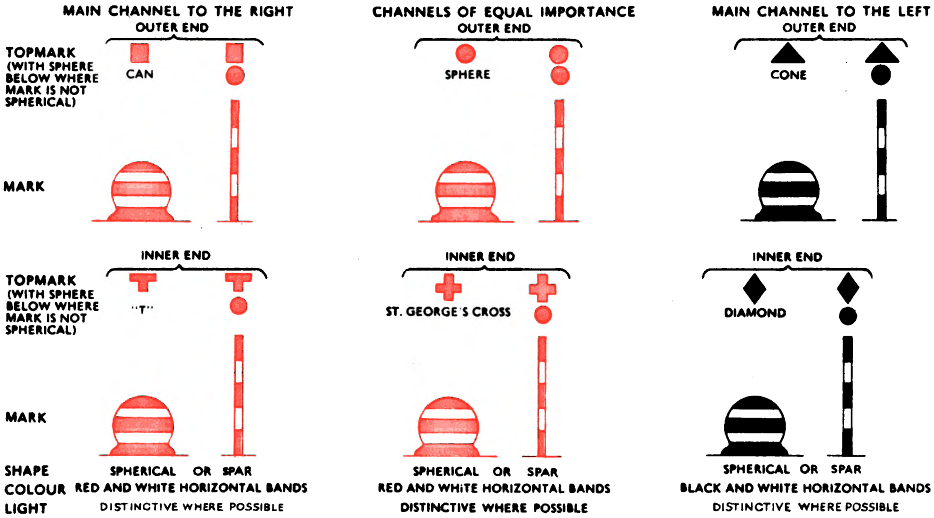
Charts 2203, 2127, 2483.

DIAGRAMS ILLUSTRATING THE UNIFORM SYSTEM OF BUOYAGE

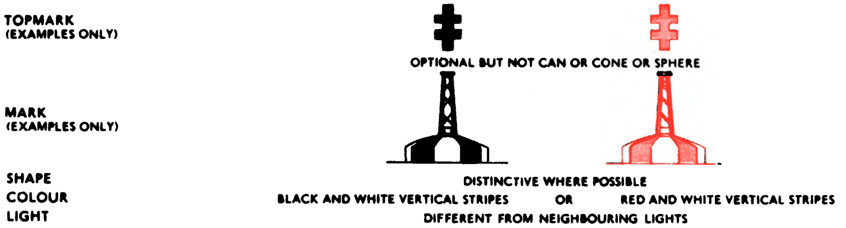
LATERAL SYSTEM



MIDDLE-GROUND OR BIFURCATION OR JUNCTION MARKS

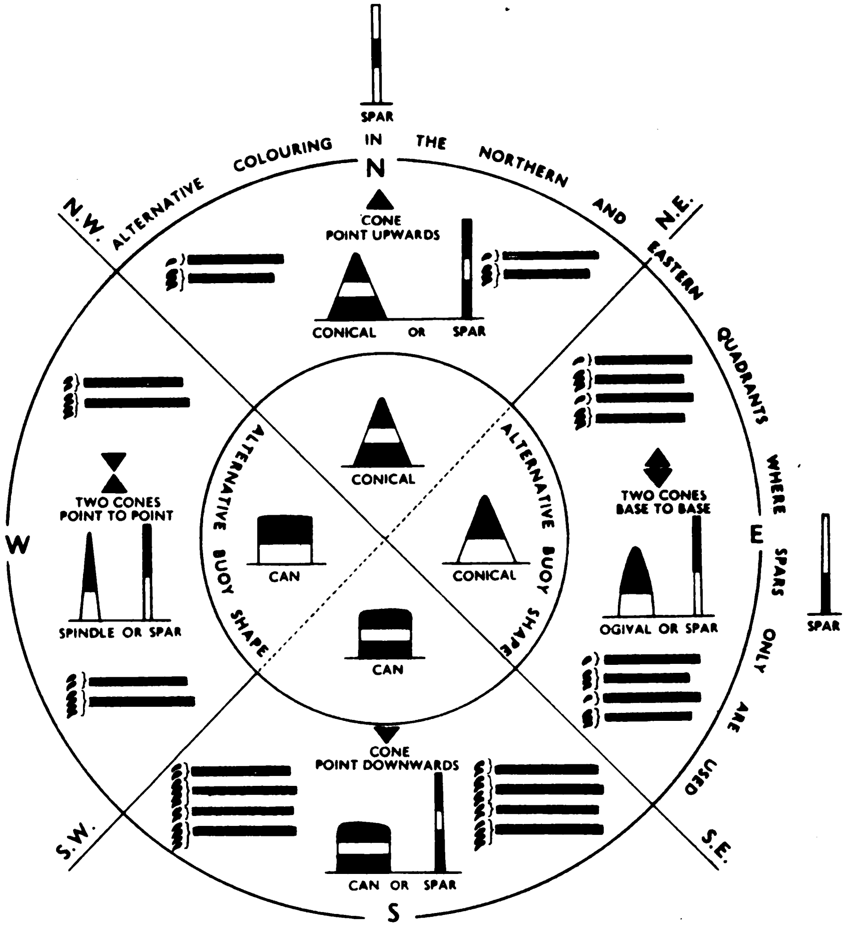

MAIN CHANNEL TO THE RIGHT
CHANNELS OF EQUAL IMPORTANCE
MAIN CHANNEL TO THE LEFT
OUTER END
OUTER END
OUTER END
TOPMARK (WITH SPHERE BELOW WHERE MARK IS NOT SPHERICAL)
CAN
SPHERE
CONE
MARK
INNER END
INNER END
INNER END
TOPMARK (WITH SPHERE BELOW WHERE MARK IS NOT SPHERICAL)
"T"
ST. GEORGE'S CROSS
DIAMOND
MARK
SHAPE
SPHERICAL OR SPAR
SPHERICAL OR SPAR
SPHERICAL OR SPAR
COLOUR
RED AND WHITE HORIZONTAL BANDS
RED AND WHITE HORIZONTAL BANDS
BLACK AND WHITE HORIZONTAL BANDS
LIGHT
DISTINCTIVE WHERE POSSIBLE
DISTINCTIVE WHERE POSSIBLE
DISTINCTIVE WHERE POSSIBLE

MID-CHANNEL MARKS


TOPMARK (EXAMPLES ONLY)
OPTIONAL BUT NOT CAN OR CONE OR SPHERE
MARK (EXAMPLES ONLY)
SHAPE
COLOUR
LIGHT
DISTINCTIVE WHERE POSSIBLE
BLACK AND WHITE VERTICAL STRIPES
OR
RED AND WHITE VERTICAL STRIPES
DIFFERENT FROM NEIGHBOURING LIGHTS

DIAGRAMS ILLUSTRATING THE UNIFORM SYSTEM OF BUOYAGE

CARDINAL SYSTEM

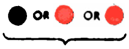
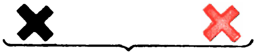
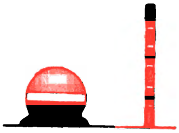
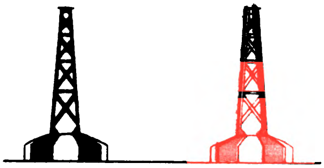


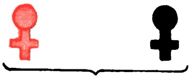
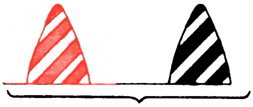
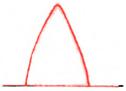
NOTE. SLIGHT MODIFICATIONS IN MINOR DETAILS TO THE ABOVE HAVE BEEN INTRODUCED BY CERTAIN COUNTRIES

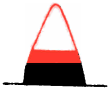
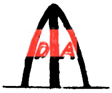
DIAGRAMS ILLUSTRATING THE UNIFORM SYSTEM OF BUOYAGE

MARKS COMMON TO BOTH SYSTEMS

AND OTHER MARKS

	ISOLATED DANGER MARKS	FAIRWAY MARKS
TOPMARK	 SPHERE	 OPTIONAL (SEE FOOTNOTE)
MARK		
SHAPE	SPHERICAL OR SPAR	OPTIONAL (SEE FOOTNOTE)
COLOUR	WIDE BLACK AND RED HORIZONTAL BANDS SEPARATED IF DESIRABLE BY A NARROW WHITE BAND	BLACK AND WHITE VERTICAL STRIPES OR RED AND WHITE VERTICAL STRIPES
LIGHT	FLASHING (WHITE OR RED)	FLASHING

	TRANSITION MARKS	QUARANTINE-GROUND MARKS
TOPMARK	 OPTIONAL (SEE FOOTNOTE)	
MARK		
SHAPE	OPTIONAL (SEE FOOTNOTE)	OPTIONAL (SEE FOOTNOTE)
COLOUR	RED AND WHITE DIAGONAL STRIPES OR BLACK AND WHITE DIAGONAL STRIPES	YELLOW

	OUTFALL AND SPOIL-GROUND MARKS	AREAS USED FOR NAVAL MILITARY, OR AIR FORCE PRACTICE PURPOSES
MARK		
SHAPE	OPTIONAL (SEE FOOTNOTE)	OPTIONAL (SEE FOOTNOTE)
COLOUR	YELLOW ABOVE AND BLACK BELOW	WHITE WITH BLUE CROSS

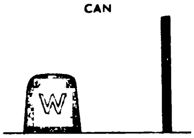
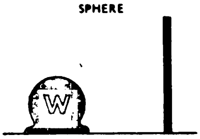
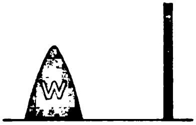
FOOTNOTE. SHAPE IS OPTIONAL AND THE ILLUSTRATIONS ARE TO BE REGARDED AS EXAMPLES ONLY THE ONLY DEFINITE REQUIREMENT IS THAT THE SHAPE ADOPTED SHALL NOT BE MISLEADING

DIAGRAMS ILLUSTRATING THE UNIFORM SYSTEM OF BUOYAGE

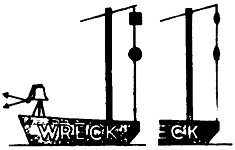
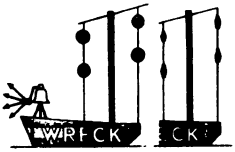
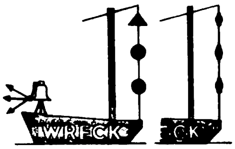
MARKING OF WRECKS

LATERAL SYSTEM

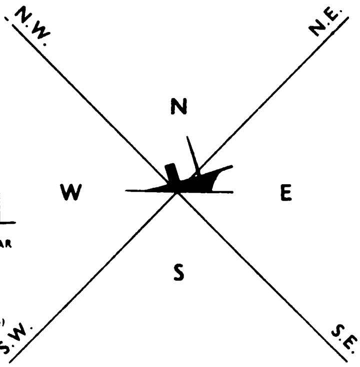
BUOYS

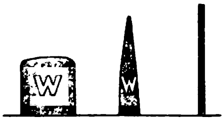
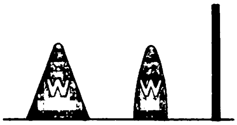
	TO BE PASSED ON THE PORT HAND	TO BE PASSED ON EITHER HAND	TO BE PASSED ON THE STARBOARD HAND
TOPMARK	■ CAN	● SPHERE	▲ CONE
MARK			
SHAPE	CAN OR SPAR	SPHERICAL OR SPAR	CONICAL OR SPAR
COLOUR	GREEN PREDOMINANT COLOUR GREEN LOWER PART RED	GREEN GREEN	GREEN PREDOMINANT COLOUR GREEN LOWER PART BLACK
LIGHT	GREEN - DOUBLE FLASHING	GREEN - SINGLE OCCULTING	GREEN - TRIPLE FLASHING

VESSELS

	TO BE PASSED ON THE PORT HAND	TO BE PASSED ON EITHER HAND	TO BE PASSED ON THE STARBOARD HAND
SHAPES	SPHERE SURMOUNTED BY A CAN IN A VERTICAL LINE	FOUR SPHERES DISPOSED VERTICALLY BY PAIRS	TWO SPHERES SURMOUNTED BY A CONE POINT UPWARDS IN A VERTICAL LINE
			
	BY DAY BY NIGHT	BY DAY BY NIGHT	BY DAY BY NIGHT
COLOUR	GREEN	WITH WHITE	INSCRIPTION
LIGHT	FIXED GREEN AND TO	CORRESPOND IN NUMBER AND ARRANGEMENT	TO THE SHAPES
BELL	TWO STROKES	FOUR STROKES	THREE STROKES

CARDINAL SYSTEM



TOPMARK	▼ ▲ TWO CONES POINT TO POINT	▲ ▼ TWO CONES BASE TO BASE
MARK		
SHAPE	CAN OR SPINDLE OR SPAR	CONICAL OR OGIVAL OR SPAR
COLOUR	GREEN	GREEN
LIGHT	GREEN - FLASHING (Rate at least 40 flashes per minute)	GREEN - INTERRUPTED FLASHING (Rate at least 40 flashes per minute)

C.B.H. 20796 - Wt. 28450 - Dd. H.0258 - 25000 - 1/52
21959 21214 - H.0254 - 120000 - 9/52

Chart 2202a.

Wreck-marking vessels :—

I. Lights, exhibited between sunset and sunrise :—

(*a*) To be passed on the mariner's port hand—

Two *fixed green* lights disposed vertically above the hull.

(*b*) To be passed on the mariner's starboard hand—

Three *fixed green* lights, disposed vertically above the hull.

(*c*) To be passed on either side—

Four *fixed green* lights placed in pairs on each end of a crossyard ; the lights of each pair being disposed vertically above the hull.

Note :—The ordinary light for a vessel at anchor is not exhibited.

II. Shapes :—Between sunrise and sunset green balls or shapes corresponding in number and arrangement to the *green* lights.

III. Fog signal, rung on a deep-toned bell at intervals of not more than 30 seconds.—

(*a*) To be passed on the mariner's port hand—2 strokes in succession.

(*b*) To be passed on the mariner's starboard hand—3 strokes in succession.

(*c*) To be passed on either side—4 strokes in succession.

Cardinal system.—Under this system, wreck marks are placed only in the East or West quadrants and have the following characteristics :—

East quadrant marks are conical, painted green, and are surmounted by two cones bases together.

Lights, if any, are *green flashing*, exhibiting groups of *quick flashes* separated by periods of eclipse.

West quadrant marks are can- or spindle-shaped, painted green, and are surmounted by two cones points together.

Lights, if any, are *green flashing*.

Caution.—In both systems, if buoys of the principal characteristic shapes (i.e. conical, can and spherical) are not available, buoys of other shapes or spar buoys may be used in their places. Such buoys will be painted in a similar manner to the marks they replace, and, if lighted, will exhibit lights with similar characteristics.

British Cameroons.—The lateral system will eventually be brought into force. All buoys and beacons are maintained by the Nigerian Marine. For system at present in use, *see* under appropriate ports in the body of this work.

Spanish Guinea.—The lateral system is in force.

French Possessions.—The lateral system is gradually coming into use and the change-over will probably be complete during 1951. In the meantime the old system may still be found in some places. The details of the buoyage in such cases will be found in the body of the work.

Portuguese possessions.—A buoyage system very similar to the lateral system is in force.

Belgian Congo.—The lateral system is gradually coming into force. For system at present in use, *see* under appropriate ports in the body of this work.

South-West Africa and the Union of South Africa.—For systems in use, *see* under appropriate ports in the body of this work.

Charts 2203, 2127, 2483.

Chart 2202a.

COMMUNICATIONS.—Radio stations.—Coastal radio stations, in the area covered by this volume, which are open for public correspondence are established as follows:—

Fernando Póo.—Basilé.
Ilha do Principe.—Santo Antonio.
Ilha de São Tomé.—São Tomé.
French Cameroons.—Douala.
Spanish Guinea.—Benito.
French Equatorial Africa.—Libreville, Pointe-Noire.
Belgian Congo.—Banana, Matadi.
Angola.—Cabinda, Luanda, Lobito, Mossamedes.
South-West Africa.—Walvis bay.
Union of South Africa.—Cape Town.

For details, *see* list published by the General Secretariat of the International Telecommunication Union.

For details of radio stations which transmit weather bulletins, storm signals, navigational warnings, time signals, etc., *see* Admiralty List of Radio Signals.

Telegraphs.—Telephones.—All towns and most of the important villages on the coast of Africa, covered by this volume, are connected to the general telegraph system, and most of them to the general telephone system.

Railways.—Sea Communications.—Air Lines.—*See* under the country concerned, in this chapter, or in the body of the work.

STANDARD AND SUMMER TIMES.—All information concerning Standard Times and Summer Times will be found in the Admiralty List of Radio Signals, Volume II.

FUEL.—Coal.—Coal to the extent of 500 tons or more is obtainable at the following places mentioned in this volume:—Pointe-Noire, Lobito, Luanda, Walvis bay, Cape Town, Simonstown.

Small quantities of coal may be obtained at Lüderitz bay.

Small quantities of patent fuel may be obtained at Boma.

Fuel oil.—Pointe-Noire, Lobito, Walvis bay, Cape Town, Simonstown; small quantities may also be obtained at Lüderitz bay.

Diesel oil.—Ango-Ango, Luanda, Lobito, Cape Town; small quantities may also be obtained at Lüderitz bay.

REPAIRS.—Under-water repairs can be undertaken at the following places, within the scope of this volume, where dry docks exist: Douala, Boma, Cape Town, Simonstown. *See* Appendix II.

There are patent slips where under-water repairs can be carried out to small craft at the following places:—Santa Isabel (Fernando Póo), Victoria, Port Gentil, Pointe-Noire, Luanda, Walvis bay, Lüderitz bay.

Above-water repairs on varying scales can also be carried out at Tiko and Lobito.

There is a naval dockyard at Simonstown.

BRITISH CONSULAR OFFICERS.—British Consular officers are stationed at the following places in the area embraced by this volume:—Santa Isabel, Douala, Libreville, Brazzaville, Leopoldville, Elisabethville, Luanda.

Charts 2203, 2127, 2483.

Chart 2202a.

REGULATIONS.—Harbour regulations, Union of South Africa and South-West Africa.—The ports and harbours in the Union of South Africa are under the control of the Railway administration. The following extracts are taken from the regulations now in force :—

Before entering a harbour every ship shall hoist her national colours.

No ship shall enter a harbour until the proper signal shall have been hoisted at the signal station authorising such entry, but this regulation does not apply to a ship entering the outer anchorage of any harbour.

The Port Captain, or any deputy he may appoint for the purpose, shall, between the hours of sunrise and sunset, board any ship arriving in the harbour as soon as practicable after her arrival, and, if possible, previous to her coming to an anchor, in order that he may point out a proper berth to the master of the ship, and in case he should be prevented from so boarding, owing to quarantine regulations or other good cause, he shall point out a proper berth for such ship, and may, if it shall appear to him necessary, order the ship to shift or change her berth to any other berth he may point out.

The master of every ship shall buoy his anchors, and should an anchor, chain or cable belonging to any ship have parted or have been slipped within a harbour, the master of such ship shall forthwith report the fact to the Port Captain and shall give to him the bearings of the spot where such anchor parted or was slipped.

No stones, gravel, ballast, carcasses, cargo, dirt, ashes, bottles, baskets, rubbish, or any objectionable or malodorous matter shall be thrown into the harbour, but the master of any ship shall cause anything of this nature to be removed day by day ; nor shall any oil be discharged into or allowed to escape into a harbour.

Pilotage.—The harbours of Table bay, Knysna, Port Elizabeth, East London, Durban, Walvis bay and Saldanha bay are compulsory-pilotage harbours, and the employment, by merchant vessels, of a pilot within the undermentioned areas when entering or leaving those harbours or shifting berth therein is compulsory, save in respect of such ships as may obtain a special exemption licence from the Administration. A pilotage exemption licence may be suspended or cancelled at any time at the discretion of the Port Captain :—

Table bay and Durban : The whole of the docks or inner harbour and within the entrance and the approaches thereto.

Port Elizabeth : The area enclosed by the breakwater and the north arm, together with the entrance and the approaches thereto.

East London : Within Buffalo river and the entrance thereto.

Knysna : Within the river.

Walvis bay : The wharf basin and the dredged channel leading thereto from the mark buoy outside its entrance.

Saldanha bay : The area contiguous to the Administration's wharves and the approaches thereto.

At certain of the harbours where pilotage is not compulsory the Administration may, for reasons of convenience and in the interests of ship owners, appoint pilots who are servants of the Administration ; such pilots may only render their services to ships upon the condition that the Administration shall not be liable for any loss or damage that may arise or be caused through the act, omission, or default of any such pilot.

Charts 2203, 2127, 2483.

Chart 2202a.

The following regulations apply at the harbours to ships conveying or loaded with inflammable liquids in bulk :—

Immediately upon the arrival at a harbour within the Union or South-West Africa, of any ship having on board inflammable liquid in bulk, the master shall furnish particulars thereof in writing to the Port Captain.

The master of every such ship shall, while remaining within the limits of the harbour, conspicuously display by day a red flag not less than 3 feet ($0^{m}9$) square, with a white circular centre 6 inches in diameter, and by night a *red* light at the masthead or where it can be best seen but not less than 20 feet ($6^{m}1$) above the deck, in addition to any navigation lights which may be required by any other rules or regulations.

The master of every ship having on board explosives, cartridges, fuses, matches, fireworks, acids, calcium carbide, or other goods of a dangerous or inflammable nature, shall on arrival give notice thereof to the Port Captain, and such cargo may not be landed before the delivery, forwarding, or warehousing orders are handed in to the Administration.

Every such ship shall, while remaining within the limits of the harbour, conspicuously display by day, B flag of the International Code of Signals and show a *red* light at a masthead by night.

Quarantine.—The standard Quarantine message, laid down in Volume II of the International Code of Signals, must be transmitted from all vessels intending to visit a port in the Union of South Africa direct from a foreign port. The message must be sent to the Port Health Officer at Cape Town, Durban or Port Elizabeth, and items I to V, inclusive, are obligatory.

Simons bay.—Regulations for dockyard port.—*See* Appendix I.

Regulations for approaching French territorial waters in time of war.—Decree of 1st October, 1934.

1. In time of war the conditions under which vessels, other than French war vessels, may enter and remain in ports and anchorages of France, her colonies, protectorates, and mandated territories, are governed by the following regulations.

2. No French merchant vessel, nor foreign vessel either war or merchant, may approach within 3 miles of the coast in the territorial waters of France, her colonies, or mandated territories without permission without running the risk of being destroyed.

3. Every vessel affected by the present decree must hoist her national flag on approaching the prohibited zone, and also her International code number ; at night, she must show her navigation lights.

If desirous of entering the prohibited zone in order to reach a port, permission must be asked as follows :—

By day, by displaying the pilot flag (G flag of International code of signals), accompanied, if possible, by the International Code signal PT (a pilot is required) made in Morse code by searchlight.

By night, by making the signal PT (a pilot is required) in Morse code, followed by her International code number, or, if she has no means of doing this, by making the night signal for a pilot in accordance with the International code, viz., a *white* light flashed or shown just above the bulwarks at short or frequent intervals for *about a minute* at a time, accompanied if necessary by a *blue* light *every fifteen minutes.*

Charts 2203, 2127, 2483.

The vessel must remain outside the zone until she has received a reply from an examination vessel or signal station.

The reply from a signal station or the examination vessel is made as follows :—

Entry permitted :

By day, by searchlight, " UI " in Morse code repeated three times, or flags " UI " of the International Code of Signals.

At night, by searchlight or flashing light, " UI " in Morse code repeated three times, or by a *white* Very's light.

Entry forbidden :

By day, by searchlight, " UJ " in Morse code repeated three times, or flags " UJ " of the International Code of Signals.

At night, by searchlight or flashing light, " UJ " in Morse code repeated three times, or by a *red-green* Very's light.

If permission is granted, the vessel must enter the prohibited zone at reduced speed, displaying by day flag G of the International Code of Signals and, at night, exhibiting her navigation lights, and must steer for the examination vessel. The latter has normally no distinguishing marks but, if she wishes to show vessels in sight that she is engaged on examination duties, she shows at the masthead a black ball by day and a *red* light at night or, alternatively, " MAJ " in Morse code three times by flashing light.

If entry is refused, the visiting vessel must immediately alter course and proceed for some other anchorage.

4. Article 4 relates to certain prohibited zones, none of which are in the area included in this volume.

5. In foggy weather every vessel affected by the present decree, desirous of entering the forbidden zone, is to display the same signals as in clear weather and blow blasts on the whistle or siren until permission to enter has been given by an examination vessel.

6. Every vessel affected by the present decree must immediately comply with the orders of a war vessel or an examination vessel or a signal station. These are given either by a warning gun or by a signal of the International Code of Signals.

Any vessel challenged by a battery or vessel of war must immediately alter course by more than eight points (90°), and steer so that she remains in sight of signals from the vessel of war or semaphore station nearest to the battery that challenged her. She may not proceed on her former course until authorised to do so.

If the vessel does not alter course after a blank charge has been fired to warn her, a live shell will be fired a few minutes later, and if a vessel does not immediately conform to this order, effective fire will be opened on her.

In urgent cases the warning by the firing of a blank charge may be omitted.

At night the warning shot with live shell may also be omitted, and any vessel entering the prohibited zone without permission is liable to be destroyed without preliminary warning.

7. Vessels authorised to enter roads and ports in France, or in the French colonies, protectorates, or mandated territories, must keep strictly within the approach channel.

For this purpose they will be piloted by a vessel set apart for this duty. Should a port have no pilotage vessel, the examination vessel will send a pilot on board the visiting vessel.

Vessels must take up the berths assigned to them and conform strictly to the special regulations in force.

The length of stay of a vessel will depend on military considerations, and when circumstances require it a vessel may be ordered to put to sea or to move to a determined point; such order must be carried out without delay, though respite may be allowed to vessels really unable to conform to it immediately.

No vessel is to get under way, either to change berth or to quit the roads, without the permission of the local authority; a request may be made by signal, " G " flag, of the International Code of Signals.

8. In naval roads and ports, between sunset and sunrise, the movement of boats, other than those of French war vessels, is absolutely forbidden.

From sunrise to sunset, movement is only allowed to boats which have received a special permit from the naval authorities and the means of making themselves recognisable.

Boats with permits should steer clear of war vessels if ordered to do so, and cannot in any case go alongside the latter without their permission. The movement of these boats will moreover remain subject to local regulations, notably those relative to the prohibition to enter certain parts of the roadstead, and to go alongside at any other places than those expressly notified.

In commercial ports similar measures will be taken by the local authority to impose the restrictions judged necessary on the movement of boats, due consideration being given to the interests of commerce.

9. Visits by neutral war vessels are governed by the decree of 29th September, 1929, so far as notification or previous authorisation is concerned, the regulations for entry being governed by the present decree.

10. The measures provided for by the present decree are to come into force on mobilisation or on special notice.

11. Any infraction of the present decree will lead to such repressive measures as circumstances admit of, in addition to the risks of destruction incurred.

Pilotage at ports in Angola.—Pilotage is compulsory for all vessels that enter or leave the Rio Cuanza, but for men-of-war the service is free.

Pilotage for merchant vessels at all other ports in Angola is optional, except for Portuguese vessels of more than 200 tons using the Portuguese anchorages and creeks in the Congo river.

At Luanda, Lobito and Mossamedes, vessels entering must not anchor until the harbour pilot makes from his boat a signal consisting of a pilot's flag by day, or a *red* light at night.

In the absence of the pilot flag, or *red* light, vessels entering ports where there are deep-water quays may proceed alongside the same. The signals referred to above will not be made when the vessel has a pilot on board.

DERATISATION.—Deratisation can be carried out, and Deratisation and Deratisation Exemption Certificates can be issued,

Chart 2202a.

at Boma, Matadi, and Cape Town; also for small and medium sized vessels at Douala.

Charts 5305, 5308.

PASSAGES.—Information concerning trans-oceanic passages will be found in the Admiralty publication entitled "Ocean Passages for the World."

Charts 2202a, 5301, 5302.

CLIMATE AND WEATHER.—General remarks.—Most of the area covered by this volume is dominated by the South-East Trade wind. In mid-ocean the trade wind blows mainly from South-East but near the African coast it is more southerly; in the Bight of Biafra it blows between South and South-West merging into the South-West monsoon of the Gulf of Guinea. In mid-ocean the trade wind is often fresh and is sometimes strong. Towards the coast it is light or moderate in the north and gales are rare; winds increase in strength southward and, south of Cape Frio especially in summer near the coast, winds are often fresh or strong and gale force is sometimes reached. The extreme south of the area is southward of the limit of the trade wind; here winds are affected by depressions centred to southward and are rather variable but mostly westerly and north-westerly. Near the 40th parallel weather is stormy, especially in winter when gales of force 7 or above may be expected on about 16 days per month.

Tropical storms do not occur in these waters.

In the north, the climate is tropical and is hot and humid throughout the year with heavy rainfall on the coasts. Rainfall and temperature decrease southwards, particularly near the coast south of about latitude 15° S. where the cool water of the Benguela current is encountered. The coast of South-West Africa, though humid, is almost rainless and very cool for its latitude with a mean annual temperature of 62° F. at Walvis Bay and only 57° F. at Port Nolloth. Further south both rainfall and temperature increase. On the Cape Peninsula the climate is temperate with warm, dry summers and cool, rainy winters.

Fog is rare in the north but visibility is sometimes poor in the Bight of Biafra on account of haze. On the coast of South-West Africa, and to a less extent on the coast of Angola, sea fog and mist are liable to form over the cool coastal water and to drift over the coast. South of Port Nolloth sea fog and mist are less prevalent.

Pressure.—(*See* Diagrams Nos. 1 and 2.)—Average pressure is high throughout the year in the South Atlantic ocean to the west of the southern part of the African continent, the centre of this anticyclonic region being near longitude 10° W. between latitudes 25° and 30° S. Northward and north-eastward of this high-pressure area, average pressure decreases slowly; to the south of it, average pressure decreases rapidly with increasing latitude.

This South Atlantic anticyclone is more intense and extensive in the southern winter, when it stretches over the southern part of the continent, than it is in the summer, and, in the south, average pressure is considerably higher in winter than in summer.

Average values of the pressure for each month and the year are given for a number of ports on pages 70-82. The seasonal change, especially in the north (where it is small), is closely related to the movement,

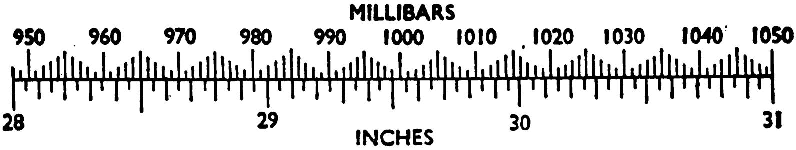
Charts 2203, 2127, 2483.

Charts 2202a, 5301, 5302.

intensity and extent of the South Atlantic anticyclone. Average pressure is highest in the southern winter (generally in July and August) and lowest in the southern summer, generally in March in the north and January or February in the south. Towards the Cape the weather is largely governed by a series of anticyclones, and intervening troughs of low pressure, travelling in an easterly direction, and large irregular variations of pressure, exceeding 30 mb. at times, may occur.

The diurnal variation of pressure is most marked near the equator where its amplitude averages 3 to 4 mb. The amplitude decreases to about 1½ mb. at Cape Town; in this region the diurnal variation is often masked by the larger irregular changes of pressure due to travelling depressions and anticyclones. Pressure is on the average highest about 1000 and 2200 local time, and lowest about 0400 and 1600.

Barometer readings.—The accompanying diagram shows the equivalent of inches and millibars and the converse.



Winds.—(*See* Diagrams Nos. 1 and 2.)—*The South-East Trade wind.*—In accordance with the circulation of winds round a region of high pressure in the southern hemisphere, the winds on the northern side of the South Atlantic anticyclone are south-easterly; they form the belt of South-East Trade winds of the South Atlantic ocean. From the equator to between latitudes 20° and 25° S. in mid-Atlantic and from about latitude 5° S. to between 25° and 30° S. near the African continent, the trade wind blows throughout the year. The trade winds, however, cannot be said to have definite limits although sometimes a ship may enter and leave them suddenly. In mid-Atlantic, from about latitudes 5° to 15° S. and longitudes 10° to 20° W. the trade wind is steady, blowing from directions between East-South-East and South-East, and is mainly of moderate strength. About 25–30% of observed winds are above force 4 and about the same proportion below force 4, though in the southern winter from latitudes 10° to 15° S. and longitudes 15° to 20° W. 40-45% of observed winds exceed force 4. Further east, and north of latitude 15° S., the trade wind gradually becomes less steady, weaker and more southerly, blowing from directions between South-East and South; near the African continent it is mainly southerly. North of about latitude 5° S. it veers towards South-West gradually merging into the South-West monsoon of the Gulf of Guinea. East of about longitude 5° E. (north of latitude 15° S.) winds are mostly light.

South of latitude 15° S. and east of the Greenwich meridian the trade wind is mainly south-easterly though it becomes more southerly near the African continent where it tends to blow parallel to the coast line. About 100 miles from the continent the trade wind is steady but it decreases in steadiness towards the coast. In the southern summer the trade wind extends southward to about latitude 32° S.; but in the winter its limit is near 30° S.; south of latitude 25° S. it is frequently interrupted by variable winds and occasionally by westerly

Charts 2203, 2127, 2483.

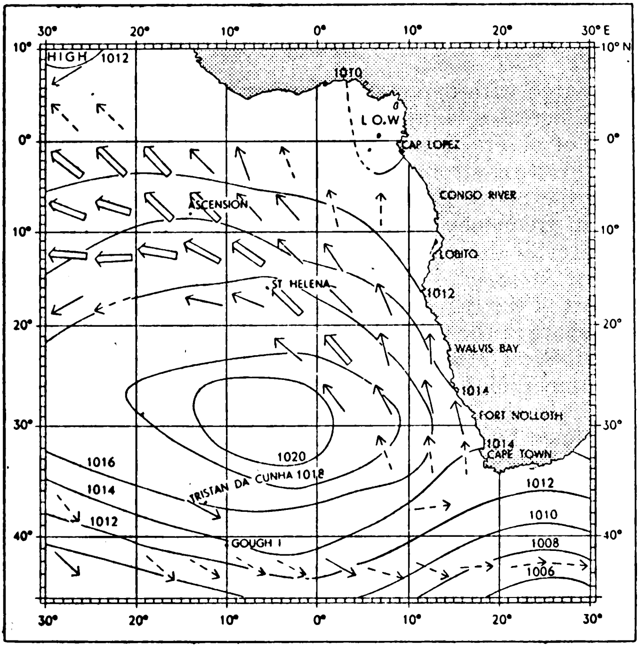


Diagram 1.
Pressure and Predominant Winds: December.

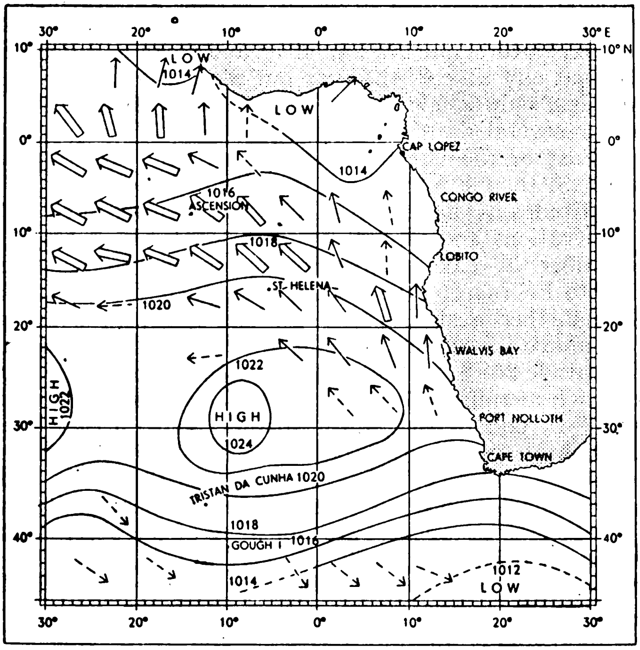


Diagram 2.
Pressure and Predominant Winds: July.

The arrows show the direction of the predominant wind, if its constancy is at least 51%, according to the following scheme:—

- - -→ 51–60% ——→ 61–80% ⟹ 81–100%

Predominance is judged in relation to that quadrant (90°), not necessarily bounded by the four cardinal points, which shows the greatest number of winds. Only winds of force 3 or more are taken into account in estimating predominance. The arrow shows the direction bisecting the quadrant, and the constancy is defined as the percentage relation between the number of winds from that quadrant, of forces 3–12, and the total number of winds observed from all directions (including forces 0–2).

Charts 2202a, 5301, 5302.

winds associated with depressions further south. The strength of the trade wind increases southward; between latitudes 15° and 20° S. about 25% of observed winds exceed force 4, further south the proportion of fresh or strong winds is between 25 and 40%.

South of the South-East Trade, winds are variable with Westerlies increasing in frequency southward; south of about latitude 35° S. westerlies prevail during most of the year.

South-West Monsoon.—The effect of the heated land mass of the northern part of the African continent is to cause south-westerly winds to blow on shore in the Gulf of Guinea. These winds which are known as the South-West Monsoon are steadiest and most extensive in the northern summer, May to September, when the interior of the continent is very hot. In the northern winter they are unsteady and are interrupted at times by the Harmattan.

Harmattan.—Between December and February or early March a dry wind from North or North-East, known as the " Harmattan," sometimes reaches the shores of the Bight of Biafra, and extends seaward. It is usually laden with fine dust; this causes a haze which may seriously impair visibility. This dust haze may drift a considerable distance seaward.

Berg winds.—Hot, dry winds blowing from the interior are sometimes felt on the coasts south of latitude 15° S. They are known as " Berg winds." Their direction on this part of the coast is usually North-East or East. These winds are usually gusty and sometimes strong (at Lüderitz they have reached force 7); they cause exceptionally high temperatures and low humidity, and are often laden with dust. They occur at any time of the year but most often in winter. They sometimes last only a few hours, but at others continue with interruptions for several days at a time.

Gales.—East of the Greenwich meridian, gales are rare north of latitude 15° S. though force 7 has occasionally been recorded at sea. Between latitudes 15° and 20° S. force 7 has been recorded in 1 or 2% of the observations and force 8 has occasionally been reached.

The number of gales increases southward. In summer, from November to February, gales are more frequent towards the African coast than further west. In January and February near the coast force 7 or above is recorded in more than 5% of ships' observations south of latitude 26° S. and in 10% south of latitude 30° S.; towards the Greenwich meridian a frequency of 5% is not reached until about latitude 33° S. and of 10% until latitude 38° S. In winter, gales decrease slightly towards the coast. Near latitude 30° S. gales are recorded in about 5% of ships' observations (3-4 days a month); the number increases rapidly southward and near latitude 40° S. force 7 or above is recorded in 30% or more of the observations, that is on about 16 days per month.

The following table shows the percentage frequency of gales between longitudes 15° E. and 20° E.

	Dec. to Feb.	Mar. to May	June to Aug.	Sept. to Nov.
Lats. 30°–35° S. . .	9	8	8	7
Lats. 35°–40° S. . .	15	15	28	22

Charts 2203, 2127, 2483.

Charts 2202a, 5301, 5302.

North of latitude 35° S. most gales are south-easterly except in winter when south of latitude 30° S. there are a number from directions between North-West and South-West. Between latitudes 35° S. and 40° S. most gales blow from directions between North-West and South-West.

Diagrams 3 and 4 show the number of gales recorded at sea in December and July.

Tornadoes.—Squalls.—Off these coasts the name Tornado is given to thundery squalls usually accompanied by heavy rain. They are quite different from the small cyclonic whirls of the same name which are well known in the United States. They may be severe local storms but are sometimes more extensive when they are akin to line squalls. They occur most often at the beginning and, to a less extent, the end of the rainy season. They are mostly encountered near the coast approaching from the land, though on occasions they have travelled a considerable distance seaward. They are most frequent north of the equator, the Cameroon coast being regarded as the southern boundary of the region where they occur regularly. They are, however, also experienced on the Loanga coast and as far south as the Congo, but are probably very infrequent further south.

Warning of the approach of a Tornado is not indicated by the barometer but is given by the appearance, usually in the East or North-East, of a dark bank of cumulo-nimbus cloud with tops extending to 20,000 feet (6,096^{m}0) or above ; at the base there is generally a roll of low cloud. The atmosphere is, as a rule, still, humid and oppressive. As the roll cloud passes overhead there is a sudden squall of wind from a direction between North-East and South-East, reaching a speed, on the average, of about 20-25 knots but frequently higher. A few minutes after the squall the rain begins, accompanied by thunder and lightning. The rain is often very heavy and may reduce visibility considerably. Over the sea the cloud base sometimes falls very low. The average duration of a Tornado is less than an hour ; the wind gradually decreases in strength and eventually shifts to its normal direction ; the rain may, however, continue for an hour or two. Tornadoes occur most often in the evening. They sometimes occur without rain when the name "Dry Tornado" is applied.

It is said that squalls are sometimes experienced without any of the above indications. These are known as "White Squalls," as the only sign of their approach is the appearance in the distance of the sea lashed into foam.

Bight of Biafra.—Twenty miles or more from the coast.—Winds are mainly from directions between South and South-West, though westerly winds, also, are rather frequent. The South-Westerlies are steadiest and strongest from May to September when 25-30% of observed winds reach force 4.

Coast.—In general, there are calms and light offshore winds in the morning and winds from South-West or West in the afternoon, though in the northern summer the South-West and West winds occasionally last all night. The morning land breezes are most regular during the northern winter, and at this season the "Harmattan" sometimes reaches the coast.

At Victoria calms are frequent in the early morning all through the year but especially from May to September ; from December to April

Charts 2203, 2127, 2483.

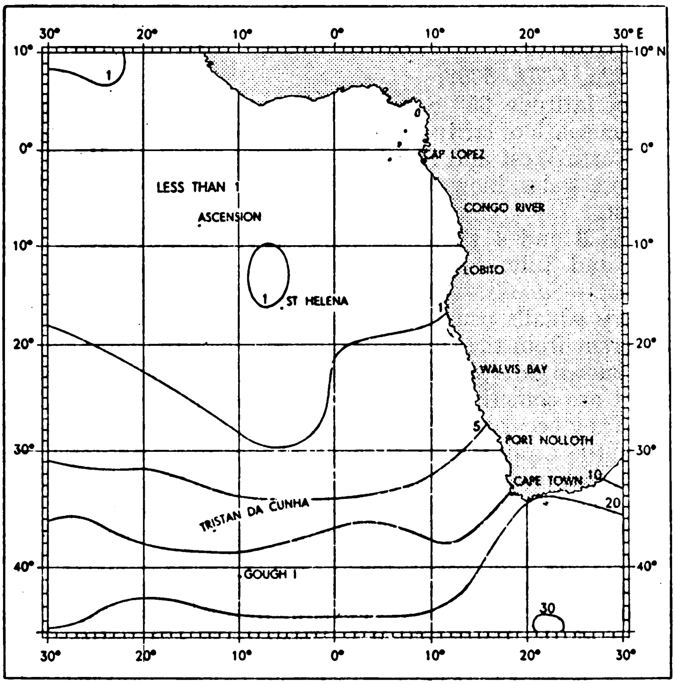


Diagram 3.
Percentage Frequency of Gale Force Winds (Beaufort 7 and over) : December.

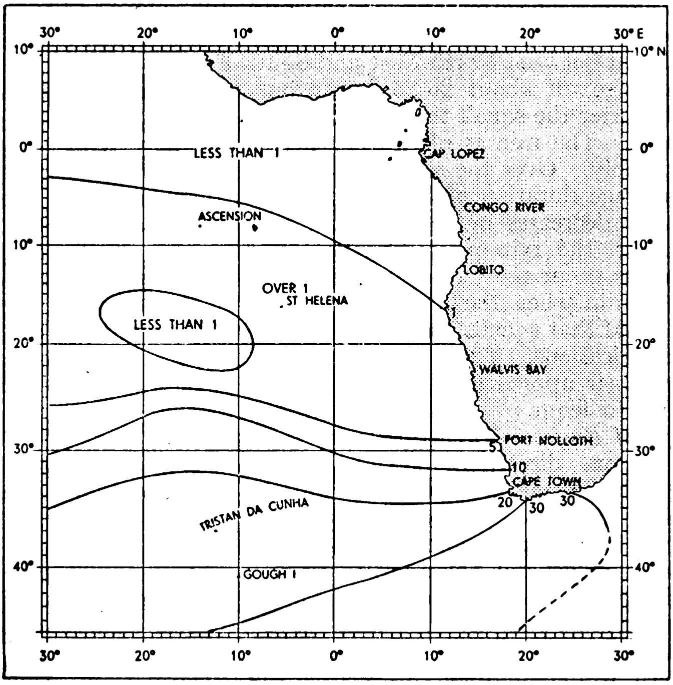


Diagram 4.
Percentage Frequency of Gale Force Winds (Beaufort 7 and over) : July.

Table for converting percentage frequency of gales to gale days per month

For the area covered by the chart, the table gives the average number of gale days per month corresponding to any given percentage frequency. For example, along the 20 contour, 12 gale days a month, on an average, may be expected.

Percentage frequency of gales	1	3	5	10	15	20
Average number of gale days per month	1	2	3½	6½	9	12
Percentage frequency of gales	25	30	35	40	45	50
Average number of gale days per month	14	16	18	20	21	23

North-Easterlies are frequent at this time. In the afternoon South-Westerlies predominate throughout the year; they are sometimes fresh and occasionally strong.

Winds at Douala are given in the table on page 71.

At Grand Batanga, a single year's observations show the prevailing direction to be East at 0700 and South-West at 1400.

On Elobey Chico westerly winds usually prevail during the daytime and occasionally continue throughout the night.

At the Gabon estuary land and sea breezes are felt all through the year. The sea breeze sets in about 1100 reaching its maximum strength about 1530 or 1600; it blows from South-West in the dry season and from between West and North-West in the rainy season; it dies away about two hours after sunset. The land breeze begins about 2300 or midnight and is stronger about 0600 or 0700; it sets in from East or South-East but is southerly by 0700; it falls calm about 1000.

Tornadoes are experienced on these coasts. On the Cameroon coast it is reported that there are about 5 a year with squalls reaching or exceeding force 6. They are most frequent from February to April and September to November.

At the mouth of the Gabon Tornadoes are said to be most violent between February and April. At Port Gentil they blow from the mainland towards Île de Lopez causing the sea to rise quickly.

Cap Lopez (Lat. 0° 38′ S.) to Congo river (Lat. 6° 07′ S.).—Twenty miles or more from the coast.—Winds fluctuate between South-East and South-West with those from south predominating; winds are mostly light though sometimes reach force 4 and occasionally force 5.

Coast.—On the coast, the southerly winds are deflected to South-East in the morning by the land breeze, and to South-West and occasionally to West in the afternoon by the sea breeze. Sometimes, however, a light offshore land breeze blows in the early morning in which case after a short period of calm the southerly winds set in early in the forenoon. On the Loanga coast the sea breeze sometimes veers towards West in the afternoon, it is said to reach force 5 or 6 at times.

At Banana, a light southerly or south-easterly land breeze blows about sunrise, after which calm generally prevails till about 1100. The south-westerly sea breeze then blows till about 1900 and after a period of calm, southerly winds tend to set in again about 2200. Easterly or northerly winds are somewhat more frequent in the rainy months, this tendency being most marked in the months with most rain, namely November, December, March, and April. The winds are strongest in October, and weakest in July. The sea-breeze works gradually up the Lower Congo, its direction being said to follow the line of the banks; it reaches Boma as a light south-westerly breeze in the early afternoon, after which it veers and freshens and attains its greatest force about sunset. At Matadi, it is said not to begin till late in the afternoon often blowing fresh in the evening till about 2200.

Tornadoes are said to occur on the Congo in the rainy season between November and April; these are probably thunderstorms, they are reported to be more severe above Quissanga than in the Lower Congo.

Congo river (Lat. 6° 07′ S.) to *Rio Cunene (Lat. 17° 14′ S.).—Twenty miles or more from the coast.*—Southerly winds predominate, gradually backing towards South-East with increasing distance westwards. The

Charts 2202a, 5301, 5302.

strength of the wind increases westward and southward. Force 7 is reached in 1-2% of the observations.

Coast.—Land and sea breezes develop on the coast though land breezes are not very regular, and sometimes the southerly winds blow all day and night especially in October and November. The sea breeze usually sets in during the forenoon from South-West and often veers to West in the afternoon. It is strongest from October to March when at Luanda it averages about 12 knots; it is weaker on the southern part of the coast averaging about 7 knots at Mossamedes. On the northern part of the coast there are light land breezes from directions between North-East and South-East, but on the southern part land breezes rarely develop, in the morning there are usually calms or winds from between South and West.

Warm, dry easterly winds (*see* " Berg winds," page 52) are occasionally felt; they are said to be rather frequent in Baia dos Tigres and to carry dust.

From Cabo Negro to Cape Frio winds from between South and South-West are stronger than further north and raise a swell which makes approach to the land difficult.

Rio Cunene (*Lat. 17° 14′ S.*) *to Orange river* (*Lat. 28° 39′ S.*).—*Twenty miles or more from the coast.*—Southerly winds prevail near the coast, which back towards South-East with increasing distance seaward. The wind increases in strength to the southward reaching a maximum off the southern part of the coast of South-West Africa. In winter the strength of the wind increases somewhat westward, but in summer winds are stronger near the coast. In this season, off the southern part of the coast gales of force 7 or above are recorded in 5 to 10% of ships' observations.

Coast.—The prevailing southerly winds are interrupted at times by Berg winds (*see* above) and, for short periods, by light winds from between North and North-West accompanied by cloud and fine drizzle. Both the Berg winds and the north-westerlies are most frequent in winter.

The Berg winds rise, as a rule, during the early hours of the morning, causing a rapid rise of temperature in the forenoon. They often die away about noon and are followed in the afternoon by a light sea breeze from West or South-West; but they may set in again the next morning.

Land and sea breezes are regular. During spells of southerly winds the sea breeze is South-South-West or South-West in the afternoon, backing towards South in the evening. In the summer half-year, when winds are strongest, the average strength in the afternoon is force 4 at Walvis bay and force 5-6 at Lüderitz; winds may, however, reach force 7 at times. At Lüderitz force 7 is reached or exceeded in the afternoon on about 70 days a year mostly between September and February, and force 9 has been recorded. These strong winds usually occur in spells of a few days at a time. The fresh and strong sea breezes raise the sand. During north-westerly spells the wind usually backs to West-North-West or West in the afternoon. Land breezes blow from directions between North and South-East; they are usually light but may be moderate during spells of stronger wind.

The south-westerly winds send a swell into Lüderitz bay which may continue after the wind has subsided.

Charts 2203, 2127, 2483.

At Swakopmund winds are not so strong as at Walvis bay and sand storms are said not to occur.

Orange river (*Lat. 28° 39′ S.*) *to Cape St. Martin* (*Lat. 32° 43′ S.*).—*Twenty miles or more from the coast.*—In summer, winds are mainly from directions between South-East and South, the frequency of south-easterlies increasing with distance westward; they are steady in the north, but steadiness decreases somewhat southward. Winds are often strong, especially near the coast where force 7 is recorded in about 5-10% of ships' observations in the north and in more than 10% in the south, but gales are less frequent further west.

In winter, winds are more variable; the trade wind is often interrupted by north-westerlies associated with troughs of low pressure extending from depressions further south. Near the coast gales are somewhat less frequent than in summer but further west they are more frequent.

Coast.—Afternoon winds are mostly South or South-South-West, though they are usually light or moderate, they are occasionally strong. At Port Nolloth force 7 has been recorded on about 12 days per year. In the morning, calms are frequent also light south-easterly winds in summer and easterly winds in winter.

As further north, Berg winds occur chiefly in winter though occasionally in the other seasons. They usually rise in the early morning and tend to die away after noon until the next morning.

Cape St. Martin (*Lat. 32° 43′ S.*) *to Cape Hangklip* (*Lat. 34° 24′ S., Long. 18° 50′ E.*).—*Twenty miles or more from the coast.*—The weather is controlled by anticyclones moving eastward with intervening troughs of low pressure which extend from depressions centred further south (*see* standard article on "Lows" in the southern hemisphere on page xxxv). During the anticyclonic spells the winds are between South-East and South (the trade winds). These are interrupted at times by winds backing from North-East to North-West and then to South-West, associated with the troughs of low pressure. These latter are most frequent, intense and extensive in winter.

In summer, the trade winds from between South-East and South prevail. They are interrupted at times by the Northerlies and North-Westerlies mentioned above; these latter are not as a rule strong or of long duration. The trade wind is sometimes strong near the coast where it occasionally reaches gale force.

In winter, though the weather is much more often affected by depressions whose centres lie to the southward, the South and South-East winds are still frequent, and winds vary mainly between South-East and North-West through West. The first signs of the approach of a depression, apart from falling pressure, are the appearance of cirrus cloud and the subsiding of the South-East wind and subsequently the backing of the wind to North-East. It may blow from between North and North East for a day or more before shifting to North West. The North West winds are often strong and sometimes reach gale force. At the cold front there is a sharp backing of the wind to West and South West often in a series of squalls. The squalls are sometimes accompanied by hail and occasionally by thunder.

Coast.—In summer South winds prevail on the northern part of the coast, and South and South-East winds (the "South-Easters") on the Cape Peninsula where they blow about 60% of the time. This is the windiest season. The South winds at Cape Columbine are usually moderate or fresh; the South-Easters at the Cape are often fresh and sometimes reach gale force. These prevailing winds are interrupted at times by northerly and north-westerly winds; the North-Westerlies are not as a rule strong or of long duration at this season.

On the northern part of the west coast the effect of land and sea breezes is not very marked during spells of southerly winds; the wind merely freshens during the forenoon and sometimes veers slightly towards South-West in the afternoon. During northerly winds, mornings are often calm; about mid-day the wind becomes light North-West sometimes backing to West.

In Saldanha Bay southerly winds are sometimes strong in the afternoon, freshening about mid-day after light winds in the morning. Strong South-East winds raise a rough sea which causes a "scend" in the northern end of the bay, this may persist a day or two after the wind has dropped. The warm North-East (Berg) wind sometimes sets in suddenly in the late afternoon and, reaching force 4 or 5, raises a choppy sea in the bay. Winds from South-West and West raise a swell outside which often comes through the entrance.

On the Cape Peninsula during the summer the South-Easter often blows with little interruption for several days at a time with fine weather apart from a white cloud on Table Mountain known as the "Table Cloth." It sets in from South or even South-South-West and gradually backs to South-East. Its direction and strength are affected by the high land and vary considerably from one point to another; Table Mountain shelters much of Cape Town and the docks from the more southerly winds but affords no protection from South-East winds. Land and sea breezes are not very marked on the Atlantic side of the Peninsula; a light sea breeze from North-West is felt in Cape Town and Table Bay during warm weather with light winds. In False Bay the sea breeze strengthens the South-Easter which nearly always freshens in the afternoon. It sometimes happens that a fresh South-Easter blows in False Bay while there is a light sea breeze from North-West in Table Bay. As the north-westerly winds are not strong at this season Table Bay is considered safe; though sometimes the South-Easter blows strong enough in the bay and dock area to cause difficulties in berthing and fuelling. The effect of the South-Easter is much greater in Simons bay. At Simonstown winds of force 6 or above can be expected on at least 5 days a month in summer, but in some seasons they are much more frequent.* The force of the Cape South-Easter decreases about 10-15 miles seaward. The South-Easter is sometimes accompanied by a dark cloud on Table Mountain and rain or drizzle, when it is known as a "Black South-Easter." *See* under "Cloud," below.

The following remarks on these "South-Easters" are taken from "Notes on maritime meteorology" by Commander M. W. Campbell Hepworth, C.B., R.N.R.

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* Observations of wind speed made at Simonstown showed that between September 29, 1937, and February 1, 1938, out of 72 days with south-easterly winds the wind reached force 6 on 58 days. The wind usually freshened by 1 or 2 units on the Beaufort scale between 0830 and the afternoon. On some days the wind was only force 2 or 3 at 0830 but had reached force 6 in the afternoon. On two occasions it was force 5 at 0830 and by the evening there were gusts reaching 48–50 knots. These observations were taken alongside the Dockyard Basin wall; in Simons bay the wind is usually from 2 to 4 knots fresher.

"In Table bay the ordinary indications of a 'South-Easter' are well marked: a high atmospheric pressure, a clear sky, and the cloud cap known as 'The Table-cloth' on the summit of Table mountain; but it may not be generally known that during the hardest South-Easters, the Blue berg and Hottentot Holland mountains are obscured by mist, and that often after the 'cloth' has disappeared the gale continues until these mountain ranges are clear.

"In autumn, during south-easterly gales the summit of Table mountain is often quite clear Such a gale is called a 'Blind South-Easter,' but the Blue berg and Hottentot Holland mountains are clothed in mist twenty-four hours or more before the breeze springs up, by which sign it may thus be confidently foretold. Moreover the wind does not die away until these mountains are clear. The 'Blind South-Easter' is often very violent."

Autumn is, in general, the quietest season all along the coast. The South and South-East winds are weaker and fewer than in summer, and though North-West winds increase they are not so strong as in winter.

Winter in the Cape Peninsula is characterised by the prevalence of strong North-West winds, accompanied by low cloud and rain and sometimes by fog, interspersed with intervals of anticyclonic weather with south-easterly winds which are much lighter than in summer. The North-West winds are usually preceded by a day or two with light winds from North or North-East accompanied by warm weather and clear skies; at the cold front the wind backs abruptly to South-West. Strong North-West winds raise a heavy sea and swell in Table Bay which is fully exposed to them; they have in the past caused much damage to shipping in the bay. During North-West and South-East winds there is a swell in False Bay. During the squally South-West winds behind the cold front (known as "Kloof" winds) heavy squalls blow down the mountains into Simons bay, making boat sailing dangerous. At Simonstown the wind reaches or exceeds force 6 on about 3 days a month.

On the northern part of the coast the North-West winds are not so strong or so frequent as at the Cape.

In Spring the South and South-East winds increase in frequency and strength all along the coast while the influence of depressions diminishes.

Cloud.—The shores of the Bight of Biafra are cloudy, with average amount of 7 tenths or above. On the Cameroon coast days with clear skies are very infrequent; in the wet season more than half the days are very cloudy and even in the dry season very cloudy days are more frequent than clear days. Near the Gabon estuary the dry season has as much cloud as the wet season.

Low stratus covers the coast from Cape Frio to Cape Columbine on most mornings throughout the year; it is also prevalent on the north coast of Angola during the cool season. It usually breaks up during the forenoon and in the afternoon the sky is often less than half covered.

On the Cape Peninsula the cloud is mostly associated with depressions and is a maximum in winter, when the sky is usually overcast during North-West winds. When the South-Easter is blowing a heavy white cloud forms on the slopes of Table Mountain (where it is known as the "Table Cloth") and of Hottentot Holland and Drakenstein ranges. The cloud forms when the South-Easter has been blowing fresh for a day or two, when it covers the summits and extends down

Charts 2202a, 5301, 5302.

the western slopes. South-Easters are sometimes associated with depressions in which case Table Mountain is enveloped in a dark cloud (the " Black South-Easter ").

Rainfall.—*Coast.*—The rainfall is very heavy in the north, especially on the coast of the Cameroons where more than 100 inches (254$^{\text{cm}}$0) fall in a year. Debunja, on the windward side of high mountains, is one of the wettest places in the world with a yearly average of nearly 400 (1016$^{\text{cm}}$0) inches. Rainfall decreases considerably southward to about 50 inches (127$^{\text{cm}}$0) a year at Loanga and only 10 inches (25$^{\text{cm}}$4) round Baia do Lobito. In the Lower Congo there is more rain than at the river mouth. From Cape Frio to Port Nolloth desert conditions prevail with an annual amount of less than one inch (2$^{\text{cm}}$5), although frequent wet mists produce a damp atmosphere. South of Port Nolloth rainfall increases, and on the Cape Peninsula annual averages are similar to those of southern England though there are considerable variations within short distances.

In the extreme north the rainiest season is the summer. On the Cameroon coast the rainiest months are from June to October (the northern summer) when at Douala about 20-25 days a month have rain, and 10-15 days have considerable falls (0·4 inch (1$^{\text{cm}}$0) or more) ; in the dry season (December to February) about 5 days a month have rain. At Debunja many days in July have more than 2 inches (5$^{\text{cm}}$1) (the average for a month in London) and some days have 7 or 8 inches (17$^{\text{cm}}$8 or 20$^{\text{cm}}$3). On this coast more rain falls at night than during the daytime. On the southern Cameroon coast and on the coasts of Rio Muni and Gabon there are two rainy and two dry seasons—" the great and little dry and wet seasons." The " great rains " are between February and May, with March and April the wettest months ; October and November are also wet months. The chief dry season, which is almost rainless, is June to August. Sometime between December and February there is a short period of dry weather, " the little dry season " ; its duration and date vary along the coast, it tends to become shorter and less marked southwards. In the wettest months about 8-10 days a month have considerable rain at Libreville ; the number decreases southward to about 6-8 days a month at Mayumba and 4-6 days at Loanga.

The following remarks, taken principally from a Report of " Le Congrès National d'Hygiène et de Climatologie Médicale," Bruxelles, 1898, are based on observations made at Banana and Boma during several years :—

" The hot or rainy season usually begins during the first ten days of October with some slight showers of short duration separated by several days of dryness. Towards the end of the month, or the beginning of November, the showers gradually increase in frequency and become heavy, being nearly always accompanied by lightning. The end of December is less wet than the beginning and the ' Little Dry season ' lasts from then to the end of February, when the rains again become very heavy until the end of April, ceasing altogether about the middle of May ; this change takes place almost to the day every year, between the 13th and 17th May, after which there is continuous fine weather. The wettest months are April and November ; March and December have about half their rainfall, and January and February approach very nearly the latter months. The total quantity of rain varies much from one year to another.

Charts 2203, 2127, 2483.

"The cool or dry season, which succeeds the wet is better marked. No rain falls, occasionally there is a slight mist or Cacimbo for 5 or 10 minutes between the hours of 0500 and 0900, and the sun is almost invariably hidden by a thick covering of cloud. Grass fires commence about the 1st July, and last throughout the season."

On the coast of Angola rainfall is scanty and decreases southward. The dry season, June to September, is practically rainless. During the rest of the year the rain mostly falls in showers which are usually of short duration. March and April are the rainiest months. On the desert coast of South-West Africa the greater part of the year's rain may fall in a few hours at any time, generally in showers approaching from the interior. The morning wet mists ("mist rain") are, however, frequent and cover roads, buildings, rigging, etc., with moisture. At Swakopmund and Walvis Bay mist rain probably occurs on 150-200 days a year, mostly from August to November and March to May; in summer, December to February, it occurs on about 7-10 days a month. On the Cape Peninsula most of the rain falls in winter (nearly half the annual amount falls between June and August). At Cape Town each month from May to August has an average between 3 and 4 inches ($7^{cm}6$ and $10^{cm}2$) on about 12 days, 3 or 4 of which have considerable amounts. In summer, from December to February, there are on the average only about 3-5 days per month with rain.

Snow may fall on the mountains between April and August but does not fall on the coast.

Thunderstorms.—On the coast from Cameroons to the Congo there are thunderstorms (including Tornadoes) on about 100-150 days a year. They usually approach the coast from the interior, most often in the evening. They are often violent and accompanied by heavy rain. Further south, thunderstorms are less frequent and though violent with heavy rain are of shorter duration; the average at Luanda is 34 days a year. On the coast of southern Angola and further south thunderstorms are infrequent. At the Cape the average for the months April to June, when they are most liable to occur, is less than two.

Hail is fairly common at the Cape in winter during the showery weather that follows a cold front; it is not destructive.

Fog and Low Visibility.—In the Bight of Biafra visibility is sometimes reduced between December and February by Harmattan haze, especially if the Harmattan sets in suddenly and strongly; with a change of wind to the prevailing south-westerly direction, visibility improves. In January visibility less than 5 miles has been recorded at sea in 10% of the observations. On the Cameroon coast Harmattan haze may occur any time between early December and early March; on the coast of Spanish Guinea (Rio Muni) it is most likely in December and January. In the rainy season drizzle and wet fog and mist often limit visibility. Mist is said to occur in the dry season at the mouth of Rivière Gabon, though at Libreville fog and mist are infrequent and seldom persist after 0900, otherwise visibility is usually 7 to 10 miles. Further south in the dry season (June to August) visibility is often reduced at Loanga and Pointe Noire by morning mists and on the coast of Belgian Congo by smoke from grass fires. Information for a short period suggests that at Banana visibility is most likely to be between 2 and 5 miles in the morning and between 5 and 10 miles in early

Charts 2202a, 5301, 5302.

afternoon. At Boma, some 50 miles up the Congo, visibility is likely to be below 5 miles at 0700 in June and July and above 5 miles from August to December.

Off most of the coast south of the Congo visibility is often reduced by fog, mist, haze or fine drizzle. Fog and mist form off the coast over the cool up-welling water of the Benguela current and may extend up to 100 miles seaward. They form either with northerly or southerly winds. Northerly winds are usually light, and fog or mist is liable to form suddenly at any time. Winds are however most often southerly and fog forming in these winds and carried northward by them is rather persistent at sea.

The southern part of the Angola coast (Benguela to Rio Cunene) has much less fog and mist than the northern part, but fog increases again south of Cape Frio and reaches a maximum round Port Nolloth. From Cape Columbine to Cape Point, as the Benguela current becomes narrower, the amount of fog decreases.

The coastal fog often spreads over the land where it sometimes remains on the ground, but often it rises a few hundred feet to form low stratus cloud from which fine drizzle falls. This drizzle is known as "cacimbo"; visibility on the ground may be anything between one and 10 miles, the average is about 6 miles. Fog, mist and cacimbo are worst in the early morning and usually disperse during the day especially with southerly winds when the setting in of the sea breeze disperses them. Fog and mist forming in northerly winds are generally slow to disperse on the coast. Occasionally cacimbo obscures the sun continuously for a few days. At Luanda, though many fogs are recorded (*see* table, page 75), they mostly clear by 0900 and visibility is usually good in the afternoon.

On the coast of Angola and as far south as Walvis bay, fog, mist and cacimbo are most prevalent from May to August; visibility may also be reduced at this season by dust haze during Berg winds. Further south at Lüderitz bay and Port Nolloth, January to April are the worst months. Near the Cape the foggy season is generally late summer to early winter, April being the worst month and July the month of least fog. No month is, however, free of fog. In both Saldanha bay and False bay there is less than on the coast outside.

The following table shows for four places on the coast the average number of occasions when visibility was less than half a mile at the morning (0800-0830) and afternoon (1500) hours of observation. It should be borne in mind that these values are based on observations made on land where there is less fog and mist than at sea.

	Walvis Bay		Port Nolloth		Cape Columbine		Table Bay	
	Morn.	Aft.	Morn.	Aft.	Morn.	Aft.	Morn.	1200
December–February	3	0·9	28	9	19	5	11	7
March–May	11	0·9	22	15	20	9	10	8
June–August	20	3	9	6	7	5	6	3
September–November	1	4	8	4	9	3	7	4

(Based on 3-8 years' records.)

Charts 2203, 2127, 2483.

Charts 2202a, 5301, 5302.

Some indication of the duration of thick weather seaward is given by the table below compiled from the records of lighthouses. It shows the average number of hours during which the fog horns were sounding, that is, the duration of visibility less than about 2 miles.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Swakopmund . .	25	15	55	75	95	65	60	85	60	15	35	20
Pelican Point . .	65	60	80	95	100	100	60	100	80	35	45	50
Diaz Point . . .	90	115	135	85	85	70	50	95	60	70	65	75
Port Nolloth . .	160	200	215	160	105	105	45	90	60	85	80	125
Cape Columbine .	72	113	95	104	75	61	67	57	43	66	51	50
Robben Island .	25	42	46	56	42	37	15	19	28	16	18	28
Cape Point . .	30	51	30	36	26	27	7	19	28	17	30	18

(Pelican Point based on 7 years' records; others 5 years'.)

The frequency of fog recorded at sea in January and July is shown in Diagrams Nos. 5 and 6.

Temperature.—Along the coast as far south as the Congo and on the islands in the Bight of Biafra mean temperature is about 80° F. from November to May and about 75° F. from June to August or September, though south of Cap Lopez it is below 75° F. in July and August. The average daily range of temperature is 12°-13° in the former season and 10°-12° in the latter. Temperature rarely falls below 60° F. and does not often rise above 95° F.

Further south the seasonal change between the hottest months (February to April) and the coolest (July and August) gradually becomes greater; for example, at Luanda, though the mean of the hottest months is about 80° F., the mean in July and August is only 68-69° F.

South of about latitude 15° S., where the cool up-welling water of the Benguela current is close to the coast, mean temperature is considerably lower. For example, the mean annual temperature decreases southwards from 77° F. at Loango and 76° F. at Luanda to 68° F. at Mossamedes, 62° F. at Walvis bay and 57° F. at Port Nolloth (about the coolest place on the coast of southern Africa), and increases again to 63° F. at Cape Town and 65° F. at Simonstown. All along this coast from southern Angola southwards very high temperatures occur at times during Berg winds. As these winds are most common in the southern winter the highest maximum temperatures may be reached during the cool season. For example, the highest temperature recorded at Mossamedes (100° F.) and at Walvis bay (104° F.) both occurred in May. The maximum of 115° F. at Port Nolloth was recorded in April, 100° F. has been reached in August and 105° F. in September. Berg winds do not have very much effect on the night minimum temperatures, therefore fluctuations of temperature are generally a good deal larger in the cool season than in summer. Along the coast of South-West Africa day maxima are usually between 65° F. and 75° F. in summer with occasional values up to about 100° F. during Berg winds; in winter they may be anywhere between 50° F. and 100° F.

On the coast of the Cape Peninsula temperature rises very rapidly after sunrise during Berg winds (from North-East or East) and maxima

Charts 2203, 2127, 2483.

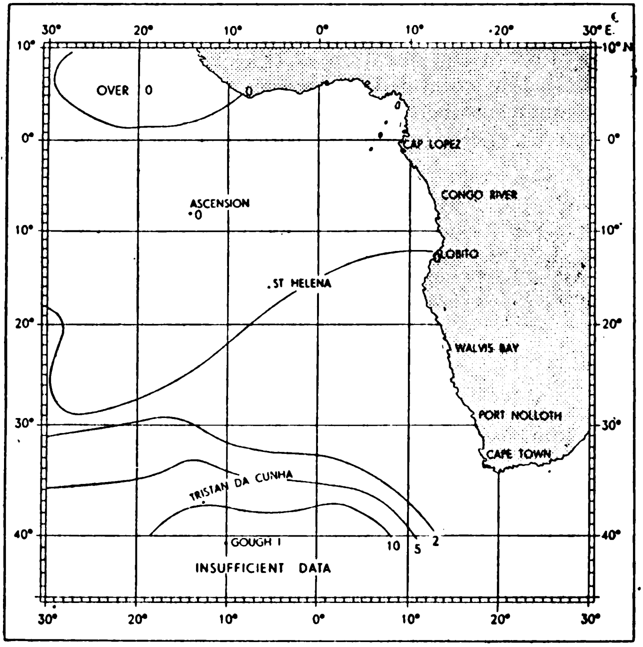


Diagram 5.
Percentage frequency of fog: January.

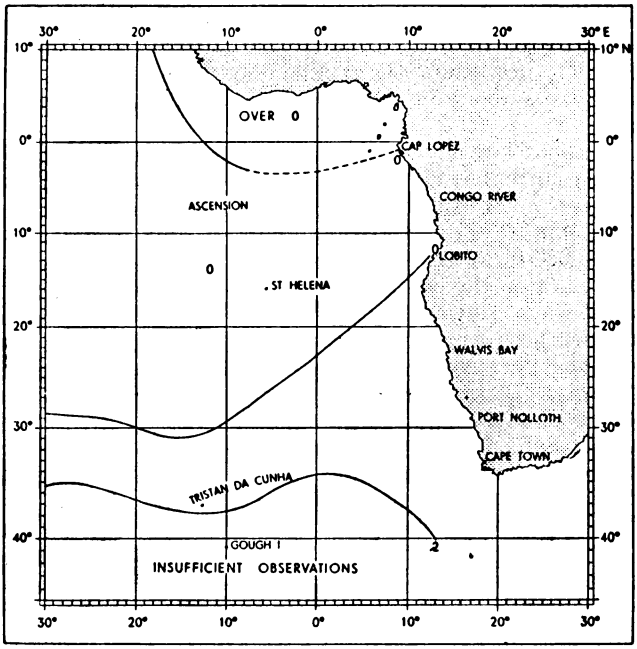


Diagram 6.
Percentage frequency of fog: July.

The dashed lines are drawn where the data is insufficient for confidence to be placed in the representation.

In view of the often rapid changes of the frequency of fog with position near the south-west coast of Africa on the inshore side of the Benguela Current, the number of ships' meteorological observations are not sufficient to give an accurate representation of the frequency in this area. Consequently the charts for percentage frequency of fog should not be regarded as reliable for this particular region.

may reach 20° above the average for the season. Cool spells occur with south-westerly winds behind a depression, in winter these winds are unpleasantly cool and raw. Frosts on the coast are very rare but they occur at times a few miles inland even near sea level. In summer, parts of the coast well exposed to the cool current are appreciably cooler than more-sheltered parts; for example, the average daily maximum in January is 80° F. at Cape Town (in Table Bay) and at Simonstown (in False Bay), but only 69° F. at Cape Point.

Humidity.—Humidity is generally high. In the Bight of Biafra the prevailing onshore south-westerly wind brings much moisture to the coasts. Further south the cool water of the Benguela current cools the surface air on the coast which often becomes almost saturated at night; when the sea breeze sets in, cool humid air is carried on to the coast. Relative humidity, however, decreases rapidly inland. Along the whole coast south of the Congo humidity is low when Berg winds are blowing, it is often about 40% but is sometimes lower. On the Cape peninsula humidity is moderate.

Sea temperature.—In the Bight of Biafra the mean sea temperature exceeds 80° F. from December to May and exceeds 82° F. in March and April; from June to November it is between 75° F. and 80° F. Sea temperature decreases southward. Near the coast southward from Benguela the decrease in temperature of the surface water is very rapid as the cool water of the Benguela current is encountered. Off Mossamedes the mean temperature in January is about 70° F. and in July 65° F. From here southward temperature increases westward as the coolest water is close inshore. Near the shore the coolest water is between Swakopmund and Port Nolloth; further south the temperature increases. Observations at Swakopmund show the mean temperature of the surface water to vary from 64° F. in February to 55° F. from July to September; in February and March, however, there appear to be large fluctuations of temperature. Over the Benguela current the air temperature is usually higher than the temperature of the sea surface.

Charts of mean sea surface temperature are given for February, May, August and November in Diagrams Nos. 7 to 10.

Local weather of the islands.—Fernando Póo.—Prevailing winds are from between South and South-West during most of the year; they are steadiest and strongest from June to August. From December to March winds are more variable and North-East winds are sometimes experienced which may be an extension of the Harmattan from the Cameroons; they are usually weak and unsteady. Light land and sea breezes are said to be felt during most of the year. Tornadoes are sometimes heavy; they usually blow from East or East-North-East but have been known to blow from North-North-West when the anchorages in Rada de Santa Isabel and Bahia de San Carlos would be on a lee shore. January to May are the warmest months with mean temperature about 80° F., in the coolest months June to September mean temperature is 4° or 5° lower. The dry season extends from about December to February but no month is rainless; June to September are the wettest months. Haze, sometimes thick, is prevalent in the dry season.

Ilha do Principe.—The climate is like that of the Gabon, hot and humid, but somewhat tempered by the island situation. The driest

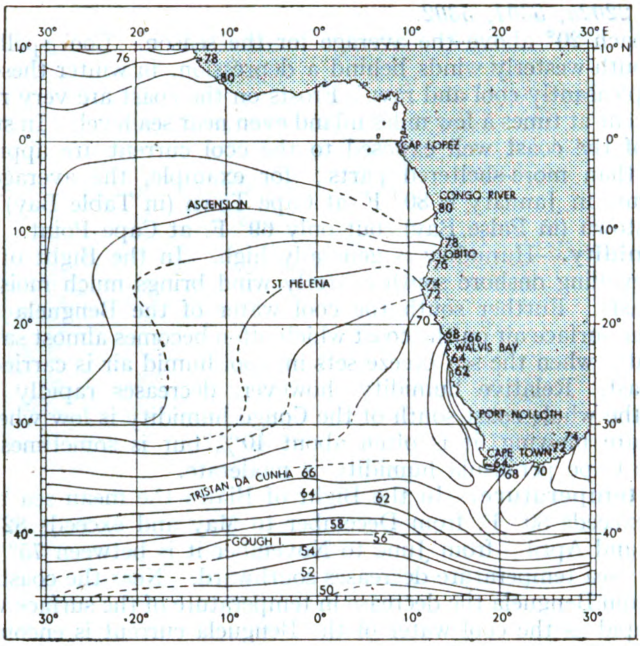


Diagram 7.

Mean Sea Surface Temperature: February.

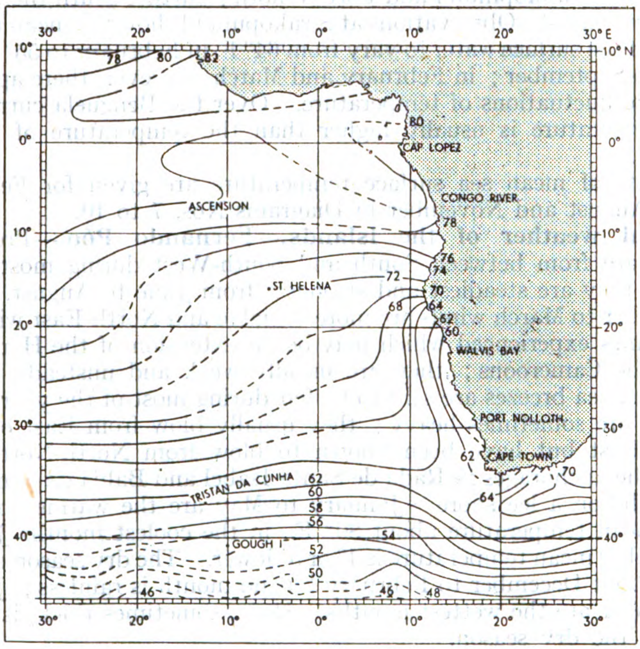


Diagram 8.

Mean Sea Surface Temperature: May.

The dashed lines are drawn where the data is insufficient for confidence to be placed in the representation.

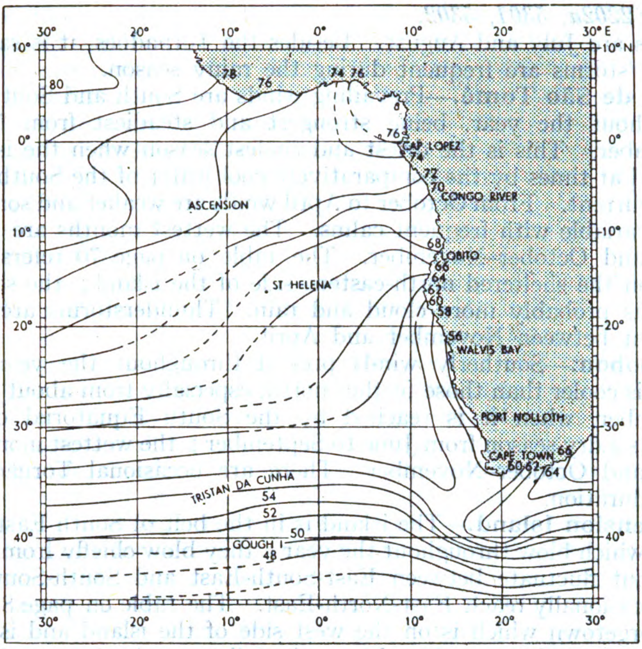


Diagram 9.

Mean Sea Surface Temperature: August.

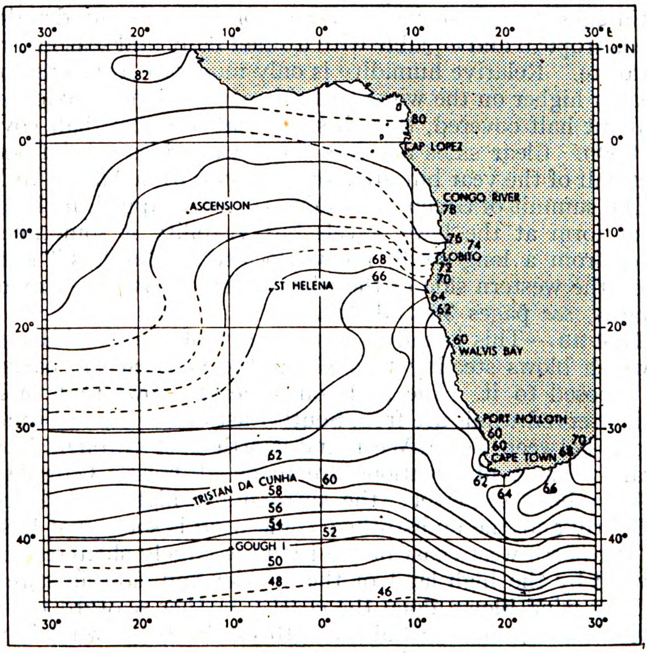


Diagram 10.

Mean Sea Surface Temperature: November.

The dashed lines are drawn where the data is insufficient for confidence to be placed in the representation.

Charts 2202a, 5301, 5302.

months are July and August. Besides the Tornadoes, it is said that violent storms are frequent during the rainy season.

Ilha de São Tomé.—Prevailing winds are South and South-West throughout the year, being strongest and steadiest from May to September. This is the driest and coolest season when the island is reached at times by the comparatively cool water of the South Equatorial current. From October to April winds are weaker and somewhat more variable with frequent calms. The wettest months are March–April and October–November. The table on page 70 refers to the town on the sheltered north-eastern side of the island; the southern side has probably more cloud and rain. Thunderstorms are rather frequent between November and April.

Annobon.—Southerly winds prevail throughout the year. The island is cooler than those further north, especially from about May to September, when it is reached by the South Equatorial current. There is a dry season from June to September; the wettest months are April and October–November. There are occasional Tornadoes of short duration.

Ascension Island.—The island is in the belt of South-East Trade winds which blow throughout the year; they blow chiefly from South-East but fluctuate between East-South-East and South-South-East and occasionally reach East-North-East. The table on page 81 refers to Georgetown which is on the west side of the island and is partly sheltered by hills to windward from the full strength of the trade wind. The rainfall is only moderate on the high ground and is very small on the sheltered west coast; at Georgetown the annual total averages less than 5 inches ($12^{\mathrm{cm}}7$) on only 22 days and many months are rainless. The rain falls mostly in light showers or intermittent drizzle. The climate is tropical and equable with a small daily and seasonal range of temperature. Relative humidity is only moderate at Georgetown but is probably higher on the windward side of the island. Skies are most often about half covered, though somewhat less than half covered at Georgetown. Clear skies are rare; overcast skies are infrequent in the first half of the year but are more common from August to November. The summit of Green Mountain is often wrapped in cloud. Fog does not form at the lower levels but visibility is sometimes poor.

Waves from a long swell, known locally as "rollers," sometimes break on the western side of the island. They have been reported in all months, *see* pages 36 and 329.

St. Helena.—This island is in the heart of the South-East Trade wind which blows steadily throughout the year on the parts of the island exposed to it. The table on page 82 shows that more than 90% of observed winds are from South-East or South, and winds from directions between South-West and North-East through North are very rare. These observations are made at Hutt's Gate at nearly 2,000 feet above sea-level; the surrounding high land deflects the wind slightly and the undisturbed trade wind is somewhat less southerly. The north-west coast of the island is largely sheltered from the trade wind by the high land of the interior and close inshore a light North-East wind blows along the coast; further seaward the wind is light South-East, and the full strength of the trade wind is reached two or three miles from the coast. On this coast, offshore winds, mainly south-easterly, blow down the valleys; these winds are often squally.

Charts 2203, 2127, 2483.

Charts 2202a, 5301, 5302.

The south-eastern part of the island, where the trade wind blows on shore against high land, is humid and cloudy and the higher mountain slopes are often enveloped in cloud. The north-western side is much clearer and many parts have very little rain. The rainfall is variable from year to year, and both floods and droughts have been experienced. The climate is equable with a small seasonal and daily range of temperature, though sheltered valleys may be hot in late summer. The mean temperature at Hutt's Gate is about 10° lower than at Jamestown. At Jamestown fog is said to be practically unknown; visibility is sometimes reduced by sea haze.

St. Helena is notorious for its "rollers," heavy waves which break along the north-west coast. They occur mostly between December and February when they may be expected on an average of one or two days per month; they sometimes continue for two or three consecutive days. The rollers occur close inshore, the sea being calm about half a mile out. The local residents say they can be forecast at least 24 hours beforehand, *see* pages 36 and 339.

Tristan da Cunha.—These islands are southward of the high pressure area and in the zone of westerly winds. The weather is affected by depressions centred to the southward. Winds are mainly from directions between South-West and North through West and follow the usual sequence of winds on the northern side of depressions in the southern hemisphere. Ships' observations in the adjacent sea area show winds from North-West and West to be most frequent throughout the year. These observations show a considerable number of gales in the area; from June to August force 7 or above is recorded in one observation in every four and in summer is recorded in one observation in 12. In all seasons sudden changes of wind occur with the passage of fronts. The climate is mild, cloudy and damp. February is the warmest month and September the coolest. Summer has an average temperature comparable with that of south-east England with no very hot days; winter is similar to early autumn in England. Relative humidity averages 80-85% with little daily and seasonal change. Annual rainfall averages probably 55 to 60 inches (139$^{\text{cm}}$7 to 152$^{\text{cm}}$4), about double that of south-east England. Clear skies are rare; skies are overcast on about one day in three.

CLIMATIC TABLES.—The tables that follow give statistics for several land stations at which there is a regularly reporting weather station. The figures given are averages, percentage frequencies or extremes, as stated: it must be realised that these values refer to the actual positions in which the weather has been observed, and *not* necessarily to the open sea or to the approaches to ports in the vicinity. The tables for land stations should therefore be consulted with discretion, especially as regards wind, visibility, cloud, temperature and humidity, since all these elements are probably affected, some a great deal, by local conditions. In particular the figures for fog at land stations or sheltered harbours are little guide to conditions at sea and in the approaches to ports.

See also "Local modification of the weather near the coast," page xlviii.

Charts 2203, 2127, 2483.

Caution.—*See* page 69.

PLACE—SÃO TOMÉ. LAT. 00° 20′ N., LONG. 06° 43′ E. Height above Mean Sea Level, 16 feet (4^{m}9).

Climatic Table compiled from 5 to 14 Years' Observations, 1874 to 1889.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days		RAIN		WIND DIRECTION																		Mean wind speed		No. of days with wind force 8 or more ø	No. of days with fog
												0900									1500												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	09	1500	Clear less than 2/10	Cloudy more than 8/10	Average fall	No. of days with 0·04 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	0900	1500		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																				knots			
January	1010	85	72	88	69	85	79	0·3	6	4·1	9	8	0	0	0	32	1	0	2	57	2	3	0	7	51	2	0	0	35	2	3	0·1	0·2
February	1010	86	73	89	69	84	78	0	5	4·3	8	23	4	0	1	30	0	0	0	42	7	6	0	0	55	1	0	0	31	4	4	0·3	0·1
March	1010	85	73	89	69	82	77	0	6	7·0	10	12	2	0	2	50	2	0	1	31	4	0	1	1	56	6	0	0	32	3	4	0·6	0
April	1011	85	73	88	69	84	79	0	7	5·6	10	14	4	0	5	41	3	0	1	32	13	1	1	3	55	3	0	0	24	3	4	0·1	0
May	1012	83	73	87	69	83	79	0·3	6	4·7	8	2	1	0	11	59	7	0	0	20	0	0	2	9	60	10	0	0	19	5	5	0	0
June	1014	81	71	84	66	78	75	0·4	6	0·5	0·9	4	0	0	8	69	10	0	0	9	3	0	0	8	74	5	0	0	10	7	7	0	0
July	1015	80	70	83	65	76	73	0·6	6	0·0	0	2	2	2	5	71	8	0	0	10	3	1	0	4	65	12	0	0	15	5	4	0	0·1
August	1015	81	70	84	64	76	73	0·2	5	0·4	1	10	1	1	2	45	11	0	0	30	8	1	1	4	50	11	0	0	25	4	4	0	0
September	1013	82	71	85	68	78	76	0	8	0·9	4	14	1	0	4	41	11	0	2	27	13	0	0	1	39	12	0	1	34	4	3	0	0
October	1013	83	72	87	69	80	79	0·2	5	4·3	10	17	3	0	4	42	3	0	2	29	2	4	0	1	45	10	0	0	38	4	3	0	0
November	1012	84	72	88	69	82	78	1	6	5·7	9	7	1	0	3	41	5	0	1	42	2	0	0	4	47	8	0	0	39	2	3	0	0
December	1011	85	72	88	69	84	77	1	4	3·6	6	9	3	0	4	47	2	0	0	35	3	2	1	3	50	2	0	0	39	3	3	0	0·4
Means	1012	83	72	90*	63**	81	77	—	—	—	—	10	2	0	4	48	5	0	1	30	5	1	1	4	54	7	0	0	28	4	4	—	—
Totals	—	—	—	—	—	—	—	4	70	41·1	76	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	0·8
Extreme values	—	—	—	91†	60††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No of years' observations	6	8–13				14				8–13	14	5																				8–13	

Standard of time: G.M.T.

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature.
†† Lowest recorded temperature.

ø Tornado squalls.

Authority :—Lisbon, Observatório Central Meteorológico " Infante D. Luiz ", Annales, Postos meteorológicos Annexos, 1874-1889.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

Caution.—*See* page 69.

PLACE—DOUALA. LAT. 04° 03′ N., LONG. 09° 41′ E. Height above Mean Sea Level, 26 feet ($7^{m}9$).

Climatic Table compiled from 5 to 28 Years' Observations, 1885 to 1913.

MONTH	PRES-SURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days		RAIN		WIND DIRECTION																		Mean wind speed		No. of days with gale ø	No. of days with fog or mist ‡
												0700									1400												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0700	1400	Clear less than 2/10	Cloudy more than 8/10	Average fall	No. of days with 0·04 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	0700	1400		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																				knots			
January	1009	86	73	88	70	95	74	3	7	1·8	4	4	15	22	6	2	1	6	3	41	1	1	0	0	3	41	46	4	4	2	9	0·2	10
February	1009	86	74	89	70	96	75	2	8	3·7	6	4	10	24	7	6	6	3	4	36	0	1	0	0	3	42	45	2	7	2	10	0·4	7
March	1008	86	73	89	69	95	76	0·5	8	8·0	12	5	12	29	8	7	3	3	1	32	1	1	2	1	4	39	42	2	8	3	9	1	4
April	1009	86	73	90	69	94	76	0·3	9	9·1	12	6	15	27	6	7	5	3	1	30	1	2	2	1	4	38	40	3	9	2	9	1	1
May	1010	86	73	90	69	95	79	0·3	10	11·8	16	7	13	26	6	8	2	4	1	33	2	1	0	1	4	34	46	2	10	2	9	1	2
June	1012	83	72	87	69	95	82	0·4	15	21·2	19	5	9	18	4	7	8	6	1	42	1	1	0	0	5	37	49	2	5	2	10	0	1
July	1013	80	71	84	69	96	86	0·3	22	29·2	24	3	4	11	4	6	8	11	2	51	0	1	0	1	4	41	43	3	7	1	9	0	1
August	1012	80	71	84	69	96	84	0	23	27·3	24	3	5	9	4	4	5	15	4	51	0	0	0	1	5	40	44	4	6	1	10	0	0·8
September	1011	81	72	85	69	95	85	0	20	20·9	21	6	11	11	5	8	6	12	4	42	0	0	0	0	3	49	37	6	5	2	11	0	0·4
October	1010	81	71	86	69	95	83	0·1	13	16·9	20	2	12	19	6	2	3	5	3	48	1	1	2	1	2	50	31	5	7	1	9	0	1
November	1009	84	73	88	69	95	80	0·2	9	6·1	10	3	12	24	6	3	1	3	3	45	1	0	1	1	0	37	47	5	8	1	10	0	2
December	1009	85	73	88	69	95	78	0·9	6	2·5	6	1	11	20	7	2	1	4	4	50	0	1	0	0	1	36	53	6	3	1	10	0	7
Means	1010	84	72	91*	68**	95	80	—	—	—	—	4	11	20	6	5	4	6	3	41	1	1	1	1	3	40	43	4	6	2	10	—	—
Totals	—	—	—	—	—	—	—	8	150	158·5	174	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	37
Extreme values	—	—	—	95†	65††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	14	17	18	17	18	15		24		28	19	16																				5	9

Standard of time: local.

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature.
†† Lowest recorded temperature.

ø Tornado squalls of force 8 or more.
‡ No definition.

Authorities :—Berlin, Mitteilungen aus den deutschen Schutzgebieten, 1914.
Hamburg, Deutsche Seewarte, Deutsche überseeische meteorologische Beobachtungen, 1922.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

Caution.—*See* page 69.

PLACE—LIBREVILLE. LAT. 00° 23′ N., LONG. 09° 26′ E. Height above Mean Sea Level, 115 feet (35^{m}0).

Climatic Table compiled from 3 to 21 Years' Observations, 1896 to 1916.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days (Estimated)		RAIN		WIND DIRECTION Mean of 0800 and 1600 Percentage of observations from									Mean wind force or speed		No. of days with strong winds ø	No. of days with fog or mist
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0800	1600	Clear: less than 2/10	Cloudy: more than 8/10	Average fall	No. of days with 0·04 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	a.m.	p.m.		
	mb.	° F.	° F.	° F.	° F.	%	%			in.														
January	—	87	73	90	69	92	82	4	11	9·8	13	0	0	3	26	3	34	13	0	21	—	—	0·6	—
February	—	88	72	91	69	93	81	3	13	9·3	11	0	0	3	21	4	29	16	0	27	—	—	1	—
March	—	89	73	91	69	92	81	3	13	13·2	15	0	0	3	21	5	29	16	2	24	—	—	2	—
April	—	89	73	92	69	94	81	3	13	13·4	14	0	0	3	23	3	29	8	7	27	—	—	2	—
May	—	88	72	92	69	92	84	2	15	9·6	11	0	0	2	23	3	27	15	3	27	—	—	1	—
June	—	85	70	89	67	89	80	2	16	0·5	1	0	0	2	22	12	28	13	2	21	—	—	0·1	—
July	—	83	68	87	66	87	79	2	15	0·1	0·7	0	0	2	27	13	26	19	0	13	—	—	0·3	—
August	—	84	69	87	67	89	79	1	17	0·7	3	0	0	0	28	8	27	21	0	16	—	—	0·2	—
September	—	85	71	88	68	90	80	2	16	4·1	11	0	0	2	25	8	32	18	0	15	—	—	0·5	—
October	—	86	71	89	68	93	83	2	16	13·6	19	0	0	1	24	2	31	18	0	24	—	—	0·7	—
November	—	86	71	89	68	93	83	2	15	14·7	19	0	0	2	25	5	28	18	0	22	—	—	1	—
December	—	87	72	89	69	94	80	3	14	9·8	13	0	0	1	24	10	21	18	0	26	—	—	0·9	—
Means	—	86	71	94*	65**	92	81	—	—	—	—	0	0	2	24	6	29	16	1	22	—	—	—	—
Totals	—	—	—	—	—	—	—	29	174	98·8	131	—	—	—	—	—	—	—	—	—	—	—	10	—
Extreme values	—	—	—	99†	62††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	—	11				3		11		21	11	11									—	—	11	—

Standard of time: local.

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature } in 21 years.
†† Lowest recorded temperature }

ø Tornado squalls.

Authorities:—Paris, Bureau Central Météorologique, Annales.
MS. data in Meteorological Office.

METEOROLOGICAL OFFICE.
AIR MINISTRY.

Caution.—*See* page 69.

PLACE—MAYUMBA. LAT. 03° 25′ S., LONG. 10° 38′ E. Height above Mean Sea Level, 200 feet (61m0).

Climatic Table compiled from 8 Years' Observations.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity	Cloud amount Scale 0—10	RAIN		WIND DIRECTION									Mean wind force or speed		No. of days with gale	No. of days with fog or mist
										0700 Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0700	0700	Average fall	No. of days with trace or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	a.m.	p.m.		
	mb.	° F.	° F.	° F.	° F.	%		in.														
January	—	84	73	88	70	95	6·4	6·5	11	32	3	10	3	42	3	7	0	0	—	—	—	—
February	—	85	72	88	69	95	6·1	9·3	12	32	4	11	11	36	3	3	0	0	—	—	—	—
March	—	86	73	89	70	95	6·7	6·2	10	35	7	16	7	29	3	3	0	0	—	—	—	—
April	—	86	73	88	70	95	5·9	10·2	12	27	7	17	7	36	3	3	0	0	—	—	—	—
May	—	83	72	87	70	94	6·6	2·3	8	23	3	29	6	39	0	0	0	0	—	—	—	—
June	—	79	69	81	67	95	6·0	0·1	0·7	30	3	14	3	40	7	3	0	0	—	—	—	—
July	—	78	68	80	65	90	5·2	0·0	0	35	10	10	3	26	3	6	7	0	—	—	—	—
August	—	79	68	83	66	82	6·4	0·2	2	32	3	10	3	29	7	13	3	0	—	—	—	—
September	—	79	70	81	67	90	6·7	2·6	9	27	10	7	10	30	8	10	3	0	—	—	—	—
October	—	82	72	85	69	95	7·6	9·3	16	36	0	3	13	29	3	13	3	0	—	—	—	—
November	—	82	73	85	71	95	6·8	10·7	16	20	7	3	4	47	13	3	3	0	—	—	—	—
December	—	83	73	85	70	96	5·5	4·6	9	29	6	3	10	39	7	3	3	0	—	—	—	—
Means	—	82	71	89*	62**	93	6·3	—	—	30	5	11	7	35	5	5	2	0	—	—	—	—
Totals	—	—	—	—	—	—	—	62·0	106	—	—	—	—	—	—	—	—	—	—	—	—	—
Extreme values	—	—	—	91†	60††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	—	8																	—	—	—	—

Standard of time: 15° E. meridian.

* Mean of highest each year.
** Mean of lowest each year.
† Highest recorded temperature.
†† Lowest recorded temperature.

Authority :—MS. Data supplied by l'Office National Météor., Paris.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

Caution.—*See* page 69.

PLACE—LOANGO. LAT. 04° 39′ S., LONG. 11° 48′ E. Height above Mean Sea Level, 164 feet (50m0).

Climatic Table compiled from 5 to 7 Years' Observations, 1896 to 1913.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days (Estimated)		RAIN		WIND DIRECTION Mean of 09, 14 and 21 Percentage of observations from									Mean wind force or speed		No. of days with gale	No. of days with fog or mist
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0900	1400	Clear: less than 2/10	Cloudy: more than 8/10	Average fall	No. of days with trace or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	a.m.	p.m.		
	mb.	° F.	° F.	° F.	° F.	%	%			in.														
January	—	85	73	89	69	89	79	3	14	5·4	10	0	0	3	5	16	37	12	1	26	—	—	—	—
February	—	86	74	90	70	87	79	2	16	6·7	12	1	0	1	7	14	26	15	4	32	—	—	—	—
March	—	87	75	91	71	87	74	3	12	6·4	12	1	2	1	21	13	24	17	3	18	—	—	—	—
April	—	87	74	90	71	87	78	3	13	8·0	14	4	2	8	11	14	19	18	3	21	—	—	—	—
May	—	84	73	87	69	89	79	2	16	3·9	7	0	0	2	9	17	28	14	0	30	—	—	—	—
June	—	81	69	84	67	87	77	3	13	0·0	0	0	0	0	2	20	35	22	0	21	—	—	—	—
July	—	78	66	81	63	86	73	3	12	0·0	0	0	0	0	2	32	43	16	1	6	—	—	—	—
August	—	78	66	81	62	88	77	1	21	0·0	0	0	0	0	0	3	60	24	0	13	—	—	—	—
September	—	80	69	83	67	87	77	1	21	0·4	7	0	0	1	11	33	36	8	0	11	—	—	—	—
October	—	83	72	86	70	86	78	1	20	4·1	15	0	0	1	11	30	46	2	1	9	—	—	—	—
November	—	85	73	87	70	88	79	1	19	6·6	14	0	2	6	14	29	32	11	0	6	—	—	—	—
December	—	85	73	88	70	90	79	3	13	6·6	11	0	0	5	9	31	39	5	1	10	—	—	—	—
Means	—	83	72	92*	62**	88	77	—	—	—	—	1	1	2	8	21	35	14	1	17	—	—	—	—
Totals	—	—	—	—	—	—	—	26	190	48·1	102	—	—	—	—	—	—	—	—	—	—	—	—	—
Extreme values	—	—	—	93†	59††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	—	7		5				7													—	—	—	—

Standard of time: local.

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature } in 7 years.
†† Lowest recorded temperature } in 7 years.

Authorities :—Paris, Bureau Central Météorologique, Annales.
MS. data in Meteorological Office.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

Caution.—*See* page 69.

PLACE—LUANDA. LAT. 08° 49′ S., LONG. 13° 13′ E. Height above Mean Sea Level, 194 feet (59ml).

Climatic Table compiled from 10 to 59 Years' Observations, 1882 to 1940.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days		RAIN		WIND DIRECTION																		Mean wind speed		No. of days with wind speed of 27 knots or more	No. of days with visibility less than ⅝ mile
												0900									1500												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0900	1500	Clear less than 2/10	Cloudy more than 8/10	Average fall	No. of days with 0·04 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	0900	1500		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																				knots			
January . .	1012	83	74	87	71	79	76	0·6	8	1·0	3	8	13	14	16	17	9	6	12	5	1	0	0	1	1	32	61	4	0	3	11	0	2
February . .	1011	85	75	89	72	77	74	1	7	1·4	3	8	14	18	19	15	11	6	3	6	5	0	1	0	0	30	55	9	0	4	12	0	0·9
March . . .	1010	86	75	89	72	79	75	0·4	10	3·0	6	7	15	19	21	9	10	6	3	10	1	1	0	0	1	26	56	14	1	3	11	0	0·6
April . . .	1011	85	75	89	72	82	77	0·6	10	4·6	8	6	17	22	19	12	5	3	4	12	5	2	1	1	1	29	49	12	0	3	10	0	2
May . . .	1012	82	73	87	68	81	78	2	3	0·5	2	7	15	15	20	16	5	3	5	14	1	0	0	0	1	32	59	7	0	3	10	0	7
June . . .	1014	77	68	81	63	81	76	3	4	0·1	0·1	5	18	24	24	11	3	2	4	9	0	1	1	0	0	27	59	12	0	3	9	0	9
July . . .	1015	74	65	78	61	82	77	3	6	0·0	0	2	23	29	21	9	2	1	1	12	3	1	0	0	0	20	56	20	0	3	8	0	11
August . .	1015	74	64	78	61	84	78	2	7	0·1	0·4	7	25	25	14	5	3	3	3	15	2	1	0	0	0	19	60	17	1	3	7	0	11
September .	1014	76	67	80	64	82	78	1	6	0·1	0·9	7	14	15	14	10	13	8	8	11	0	0	0	0	1	26	64	9	0	3	9	0	3
October . .	1013	79	71	83	68	80	78	0·3	6	0·2	2	6	3	8	12	11	22	18	10	10	1	0	0	0	0	34	63	2	0	3	12	0	0·7
November .	1011	82	73	86	71	79	77	0·1	8	1·1	4	9	6	6	13	13	18	14	11	10	0	0	0	1	1	38	58	2	0	4	13	0	2
December .	1011	83	74	86	71	78	76	0·1	8	0·8	3	13	11	9	12	14	11	10	12	8	0	1	1	0	0	34	61	3	0	3	12	0·1	0·9
Means . . .	1012	81	71	91*	60**	80	77	—	—	—	—	7	15	17	17	12	9	7	6	10	2	1	0	0	1	29	58	9	0	3	10	—	—
Totals . . .	—	—	—	—	—	—	—	14	83	12·9	32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·1	50
Extreme values	—	—	—	98†	58††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	59	27				22				59	27	10																		14			

Standard of time: 15° E. meridian.

* Mean of highest each year.
** Mean of lowest each year.
†Highest recorded temperature.
††Lowest recorded temperature.

Authorities :—Lisbon, Ministério das Colónias, Comissão de Cartografia :
Anais Meteorológicos das Colónias, 1927-40.
Luanda, Observatório Meteorológicoe Magnético " João Capelo ",
Mapas das observações efectuadas neste observatório.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

Caution.—*See* page 69.

PLACE—MOSSAMEDES. LAT. 15° 12′ S., LONG. 12° 09′ E. Height above Mean Sea Level, 41 feet ($12^{m}5$).

Climatic Table compiled from 3 to 26 Years' Observations, 1913 to 1944.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days		RAIN		WIND DIRECTION																		Mean wind speed		No. of days with wind speed of 27 knots or more	No. of days with visibility less than ¼ mile
												0900									1500												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0900	1500	Clear 2/10 or less	Cloud more than 8/10	Average fall	No. of days with trace or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	0900	1500		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																				knots			
January	1011	77	65	83	60	81	76	7	7	0·1	1	2	0	0	0	23	14	30	2	29	0	0	0	0	13	34	51	2	0	1	7	0	0
February	1011	80	69	85	61	78	79	8	4	0·2	2	0	0	0	0	22	6	33	1	38	0	0	0	0	12	33	53	2	0	1	7	0	0
March	1011	80	68	87	63	82	85	9	5	0·7	3	0	0	2	2	31	8	16	3	38	1	0	0	0	31	30	35	1	2	1	5	0	0
April	1011	81	68	91	57	80	74	14	3	0·7	2	3	0	0	3	37	10	10	10	27	0	0	0	0	13	35	47	5	0	0·9	6	0	2
May	1013	80	62	90	54	83	73	18	3	0·0	0	3	0	1	7	32	10	3	3	41	1	0	7	0	20	55	12	2	3	1	6	0	5
June	1015	71	55	86	50	87	81	8	8	0·0	0	5	0	2	6	26	14	0	2	45	1	0	0	0	14	31	32	7	15	2	4	0	2
July	1017	67	55	75	49	87	85	5	11	0·0	0	5	1	0	5	16	18	9	0	46	3	0	0	0	13	37	41	4	2	0·9	4	0	2
August	1016	67	56	75	51	86	82	6	13	0·0	0	2	3	0	3	21	18	2	2	49	0	0	0	0	15	47	31	4	3	1	5	0	1
September	1015	69	58	75	51	84	79	4	12	0·0	0	1	0	0	0	11	18	7	2	61	0	0	0	0	16	38	33	8	5	0·9	5	0	2
October	1013	73	61	78	56	81	79	5	12	0·0	0	1	0	0	0	24	20	21	6	28	0	0	0	0	16	42	36	2	4	2	6	0	0·5
November	1012	74	62	81	57	80	78	9	6	0·1	1	6	0	0	0	28	23	20	6	17	0	0	0	0	20	40	35	2	3	3	8	0	0
December	1012	75	63	82	60	82	78	9	5	0·1	1	3	0	0	0	30	22	26	3	16	0	0	0	0	20	43	36	1	0	3	8	0	0
Means	1013	75	62	95*	48**	83	79	—	—	—	—	3	0	1	2	25	15	15	3	36	0	0	1	0	17	39	37	3	3	2	6	—	—
Totals	—	—	—	—	—	—	—	102	89	1·9	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	15
Extreme values	—	—	—	99†	46††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No of years' observations	13–14	10	11			3		11–14		17		3																				10	5–6

Standard of time: 15° E. meridian.

* Mean of highest each year.
** Mean of lowest each year.
† Highest recorded temperature } in 26 years.
†† Lowest recorded temperature } in 26 years.

Authorities :—Lisbon, Ministério das Colónias, Comissão de Cartografia :
Anais Meteorológicos das Colónias, 1927-40.
Luanda, Observatório Meteorológico e Magnético " João Capelo ",
Mapas das observações efectuadas neste observatório.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

Caution.—*See* page 69.

PLACE—WALVIS BAY. LAT. 22° 56′ S., LONG. 14° 30′ E. Height above Mean Sea Level, 24 feet (7m3).

Climatic Table compiled from 3 to 25 Years' Observations, 1911 to 1944.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		Cloud amount Scale 0—10		RAIN		WIND DIRECTION																		Mean wind speed		No. of days with gale	No. of days with fog
												0830									1500												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0830	1500	0830	1500	Average fall	No. of days with 0·04 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	S.W.	W.	NW.	Calm	0830	1500		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																				knots			
January	1012	73	59	85	52	91	73	8·1	3	0·0	0	21	6	2	1	4	2	1	5	58	2	0	0	0	6	49	29	14	0	4	12	0	2
February	1012	74	60	85	54	92	73	8·5	3	0·1	1	16	5	1	0	3	3	2	4	66	0	0	0	0	5	62	23	6	4	4	11	1	1
March	1012	74	59	86	53	95	74	7·8	3	0·1	1	14	5	1	0	3	1	1	2	73	0	0	0	0	9	59	23	7	2	3	12	0	4
April	1014	75	55	92	49	89	66	6·3	1	0·1	1	7	5	3	2	3	2	1	0	77	0	0	0	0	11	62	10	3	14	3	12	0	5
May	1015	74	52	96	43	88	68	4·5	1	0·0	0	3	3	7	3	2	2	1	0	79	1	1	0	0	18	63	8	5	4	3	12	0	8
June	1017	74	48	94	37	78	64	4·0	1	0·0	0	3	7	16	5	3	1	0	1	64	3	0	1	0	18	46	14	9	9	5	10	2	11
July	1019	70	47	90	36	83	65	4·9	2	0·0	0	2	6	11	4	4	2	1	0	70	3	1	1	0	17	53	8	9	8	4	11	2	7
August	1018	68	46	88	38	89	73	5·3	2	0·0	0	5	3	5	6	4	1	0	1	75	2	1	0	1	23	54	5	8	6	3	14	0	8
September	1017	66	48	85	39	90	69	7·0	2	0·0	0	9	7	4	4	5	1	0	1	69	0	0	1	0	18	53	10	7	11	3	12	7	5
October	1015	67	51	78	43	91	72	8·1	2	0·0	0	10	8	3	3	5	4	2	2	63	0	0	0	0	19	57	9	5	10	4	14	1	1
November	1014	71	54	84	46	90	71	8·3	3	0·0	0	15	8	2	3	3	2	1	4	62	2	0	0	0	15	63	10	5	5	4	14	0	5
December	1013	72	57	83	51	90	72	8·3	3	0·0	0	21	6	0	0	4	3	2	7	57	1	0	0	0	9	59	16	7	8	4	12	1	2
Means	1015	72	53	98*	35**	89	70	6·8	2	—	—	10	6	4	3	4	2	1	2	68	1	0	0	0	14	57	14	7	7	4	12	—	—
Totals	—	—	—	—	—	—	—	—	—	0·3	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	59
Extreme values	—	—	—	104†	25††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	13–14	20		24		10	6	14	6	25	25	10									5									10		7	3–5

Standard of time: 30° E. meridian.

* Mean of highest each year } in 33 years.
** Mean of lowest each year } in 33 years.

† Highest recorded temperature.
†† Lowest recorded temperature.

Authority:—Union of South Africa, Department of Irrigation, Meteorological Branch.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

Caution.—*See* page 69.

PLACE—PORT NOLLOTH. LAT. 29° 14′ S., LONG. 16° 51′ E. Height above Mean Sea Level, 24 feet (7^m3).

Climatic Table compiled from 3 to 52 Years' Observations, 1883 to 1945.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		Cloud amount Scale 0—10		RAIN		WIND DIRECTION																		Mean wind speed			
												0830									1500												
												Percentage of observations from									Percentage of observations from												
	0830 Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0830	1500	0830	1500	Average fall	No. of days with 0·01 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	0830	1500	No. of days with gale	No. of days with fog
	mb.	° F.	° F.	° F.	° F.	%	%			in.																				knots			
January	1014	67	53	78	47	91	84	5·7	3	0·1	1	2	0	1	22	18	0	1	4	52	1	0	1	8	38	4	2	4	42	5	10	—	11
February	1014	67	54	78	47	91	84	6·0	4	0·1	1	4	0	1	22	11	0	0	11	51	1	0	0	15	36	3	2	5	38	5	12	—	11
March	1015	67	53	85	45	91	85	5·7	4	0·2	2	3	3	3	18	4	0	0	3	66	0	0	2	17	31	2	2	3	43	4	9	—	10
April	1017	68	50	95	41	84	86	5·1	4	0·2	2	6	2	11	14	2	0	0	5	60	2	2	3	14	22	5	5	3	44	5	9	—	9
May	1019	66	48	91	39	83	80	4·5	4	0·4	3	5	9	9	10	2	1	1	5	58	6	7	6	12	16	3	4	7	39	5	8	—	6
June	1021	66	46	86	38	82	76	3·8	4	0·4	3	6	11	16	6	1	0	0	8	52	4	12	8	9	12	2	7	12	34	6	9	—	5
July	1022	64	45	86	36	82	77	4·1	4	0·3	3	7	9	12	5	0	0	0	4	63	2	4	8	11	24	3	4	6	38	5	9	—	4
August	1021	64	45	88	37	81	78	4·4	3	0·3	3	9	6	9	9	3	1	1	7	55	3	3	9	11	26	5	9	8	26	5	11	—	4
September	1020	63	46	88	38	86	78	5·1	4	0·2	2	5	3	11	18	3	1	0	11	48	2	1	7	19	26	5	3	11	26	5	13	—	4
October	1018	64	48	91	42	88	83	5·2	4	0·1	1	4	2	5	20	11	0	0	15	43	0	0	2	12	40	1	3	6	36	6	12	—	5
November	1017	66	51	85	43	86	79	5·4	3	0·1	1	0	1	2	22	21	1	0	9	44	0	0	1	8	42	1	6	12	30	6	13	—	6
December	1015	66	53	77	45	90	81	5·1	3	0·1	1	2	0	1	21	17	0	1	5	53	0	0	0	4	57	5	2	6	26	5	11	—	8
Means	1018	66	49	102*	33**	86	81	5·0	4	—	—	4	4	7	16	8	0	0	7	54	2	2	4	12	31	3	4	7	35	5	11	—	—
Totals	—	—	—	—	—	—	—	—	—	2·5	23	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	83
Extreme values	—	—	—	115†	31††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	20			51		15	7–8	13	7–8	50–52		5									3–4									5	3–4	—	20

Standard of time: 30° E. meridian.

* Mean of highest each year } 33 years.
** Mean of lowest each year }

† Highest recorded temperature.
†† Lowest recorded temperature.

Authority:—Union of South Africa, Department of Irrigation, Meteorological Branch.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

Caution.—*See* page 69.

PLACE—CAPE TOWN. LAT. 33° 56′ S., LONG. 18° 29′ E. Height above Mean Sea Level, 40 feet (12m2).

Climatic Table compiled from 5 to 95 Years' Observations, 1846 to 1940.

MONTH	PRESSURE at M.S.L. 0830 Mean	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days		RAIN		WIND DIRECTION Mean of hourly observations Percentage of observations from									Mean wind force or speed		No. of days with gale	No. of days with visibility less than ¼ mile ø
		Daily max.	Daily min.	Highest in each month	Lowest in each month	0830	1230	Clear: less than 2/10	Cloudy: more than 7/10	Average fall	No. of days with 0·01 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	a.m.	p.m.		
	mb.	° F.	° F.	° F.	° F.	%	%			in.														
January	1014	80	61	95	52	66	49	14	1	0·7	4	3	0	1	29	47	3	3	11	3	—	—	—	2
February	1014	81	61	95	52	66	51	13	2	0·6	4	3	1	1	32	43	1	4	12	3	—	—	—	2
March	1016	79	59	95	50	69	52	12	2	0·9	5	4	1	1	34	33	1	6	16	4	—	—	—	3
April	1017	74	55	91	44	74	56	10	4	1·9	7	7	1	1	28	28	1	6	21	7	—	—	—	5
May	1019	68	51	83	40	76	63	7	7	3·7	11	15	1	1	16	22	2	5	27	11	—	—	—	3
June	1021	65	49	76	38	79	67	8	6	4·4	12	13	1	1	17	16	1	7	27	17	—	—	—	2
July	1022	63	48	76	37	80	68	9	8	3·6	12	13	1	1	20	23	2	7	21	12	—	—	—	1
August	1021	64	48	78	38	79	68	8	6	3·3	12	12	2	2	20	21	2	8	23	10	—	—	—	1
September	1020	66	51	82	40	76	65	7	7	2·3	10	8	1	1	19	26	3	9	25	8	—	—	—	1
October	1018	71	53	86	44	71	57	8	4	1·6	9	6	1	1	26	35	2	6	17	6	—	—	—	2
November	1017	75	56	89	47	67	52	9	4	1·1	6	5	0	1	22	47	6	4	11	4	—	—	—	1
December	1015	79	60	92	50	64	51	10	2	0·8	5	6	1	1	22	45	4	3	14	4	—	—	—	2
Means	1018	72	54	99*	36**	72	58	—	—	—	—	8	1	1	24	32	2	6	19	7	—	—	—	—
Totals	—	—	—	—	—	—	—	115	53	24·9	97	—	—	—	—	—	—	—	—	—	—	—	—	25
Extreme values	—	—	—	105†	32††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	60	20		60		38	11	10		94–95		5									—	—	—	

Standard of time: 30° E. meridian.

* Mean of highest each year } in 55 years.
** Mean of lowest each year }

† Highest recorded temperature.
†† Lowest recorded temperature.

ø At Capetown Docks.

Authority :—Union of South Africa, Department of Irrigation, Meteorological Branch.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

Caution.—*See* page 69.

PLACE—SIMONSTOWN. LAT. 34° 12′ S., LONG. 18° 26′ E. Height above Mean Sea Level, 12 feet (3^m7).

Climatic Table compiled from 4 to 29 Years' Observations, 1862 to 1940.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity	Cloud amount Scale 0—10	RAIN		WIND DIRECTION Mean of 3 observations Percentage of observations from									Mean wind force or speed		No. of days with gale	No. of days with fog or mist
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0800	0800	Average fall	No. of days with 0·01 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	a.m.	p.m.		
	mb.	° F.	° F.	° F.	° F.	%		in.														
January	1013	80	64	91	57	65	3·7	1·0	6	3	3	2	29	25	17	14	7	—	—	—	—	—
February	1013	81	65	90	58	67	3·4	0·9	5	2	4	3	32	25	9	14	11	—	—	—	—	—
March	1014	79	62	90	56	70	3·8	1·6	7	9	4	3	28	22	13	9	12	—	—	—	—	—
April	1016	75	59	87	52	73	4·7	2·7	9	13	5	4	28	16	11	9	14	—	—	—	—	—
May	1017	70	55	81	49	78	5·3	4·1	13	22	8	5	22	16	5	5	17	—	—	—	—	—
June	1019	67	53	76	47	80	5·5	4·9	14	25	10	5	14	11	6	9	20	—	—	—	—	—
July	1021	65	51	76	46	79	5·5	3·9	12	15	13	6	19	14	9	4	20	—	—	—	—	—
August	1019	66	52	79	46	76	5·5	4·2	15	13	10	3	26	10	2	8	28	—	—	—	—	—
September	1018	67	53	82	47	73	5·3	3·1	12	11	12	2	30	18	7	7	13	—	—	—	—	—
October	1017	71	56	83	49	69	5·4	2·7	11	11	4	3	26	17	6	13	20	—	—	—	—	—
November	1015	75	59	86	52	66	4·9	1·5	8	9	1	1	30	16	15	15	13	—	—	—	—	—
December	1014	78	63	88	55	65	4·1	1·3	7	5	1	1	24	27	20	13	9	—	—	—	—	—
Means	1016	73	58	95*	44**	72	4·8	—	—	12	6	3	26	18	10	10	15	—	—	—	—	—
Totals	—	—	—	—	—	—	—	31·9	119	—	—	—	—	—	—	—	—	—	—	—	—	—
Extreme values	—	—	—	103†	40††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	25–27	20	20	29	29	24	23	25–26		4									—	—	—	—

Standard of time: 30° E. meridian.

* Mean of highest each year } in 25 years.
** Mean of lowest each year }

† Highest recorded temperature.
†† Lowest recorded temperature.

Authorities :—Union of South Africa, Department of Irrigation, Meteorological Branch, Temperature, Pretoria, 1942.

—— Rainfall normals up to the end of 1935, Pretoria, 1941.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

Caution.—*See* page 69.

PLACE—ASCENSION ISLAND. LAT. 07° 56′ S., LONG. 14° 25′ W. Height above Mean Sea Level, 55 feet (16m8).

Climatic Table compiled from 8 to 15 Years' Observations, 1934 to 1951.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days		RAIN		WIND DIRECTION																		Mean wind force		No. of days with wind of force 8 or more	No. of days with fog or mist
												0900									2100												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0900	2100	Clear less than 2/10	Cloudy more than 8/10	Average fall	No. of days with 0·04 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	0900	2100		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																							
January . .	1013	86	72	88	70	64	71	0·7	0·9	0·1	1	0	9	36	54	1	0	0	0	0	0	10	36	53	1	0	0	0	0	2·0	2·0	0	—
February . .	1013	87	73	89	71	63	70	2	0	0·1	1	0	10	40	48	2	0	0	0	0	0	9	40	49	2	0	0	0	0	1·9	1·8	0	—
March . . .	1012	88	73	90	72	63	68	2	0·2	0·6	2	0	6	32	55	4	3	0	0	0	0	5	33	54	4	3	0	0	1	1·9	1·8	0	—
April . . .	1013	88	73	90	72	63	68	1	0·3	1·7	3	0	18	38	41	3	0	0	0	0	0	18	41	39	2	0	0	0	0	2·1	1·8	0	—
May . . .	1014	87	73	89	72	63	68	0·6	0·1	0·3	3	0	17	34	47	1	1	0	0	0	0	18	32	48	2	0	0	0	0	2·1	2·0	0	—
June . . .	1015	87	73	88	70	63	69	1	0	0·3	3	0	18	34	42	2	3	0	0	1	0	15	32	48	3	2	0	0	0	2·0	2·0	0	—
July . . .	1016	85	72	87	70	61	69	2	0·5	0·3	2	0	7	37	53	2	0	0	0	1	0	9	34	55	2	0	0	0	0	1·9	2·0	0	—
August . .	1016	84	71	86	69	62	67	0·9	0·9	0·3	2	0	5	34	59	2	0	0	0	0	0	4	33	60	2	1	0	0	0	2·0	1·9	0	—
September .	1016	84	71	85	69	62	68	0·3	2	0·3	2	0	10	35	55	0	0	0	0	0	0	10	34	54	0	0	0	0	2	2·1	2·0	0	—
October . .	1015	84	71	86	69	62	67	0	3	0·2	2	0	5	39	55	0	0	0	0	1	0	4	41	54	1	0	0	0	0	2·1	2·0	0	—
November .	1014	84	71	86	69	63	68	0·1	3	0·1	0·5	0	5	39	55	1	0	0	0	0	0	5	39	55	1	0	0	0	0	2·1	2·0	0	—
December .	1013	85	71	86	70	63	68	0·1	2	0·1	0·9	0	6	41	53	0	0	0	0	0	0	5	42	53	0	0	0	0	0	2·0	2·1	0	—
Means . . .	1014	86	72	91*	68**	63	68	—	—	—	—	0	10	37	51	1	1	0	0	0	0	9	36	52	2	1	0	0	0	2·0	1·9	—	—
Totals . . .	—	—	—	—	—	—	—	11	13	4·4	22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	—
Extreme values	—	—	—	92†	65††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	10							14–15		—	—	10																		8–10		14	—

Standard of time: local.

* Mean of highest each year.
** Mean of lowest each year.
† Highest recorded temperature.
†† Lowest recorded temperature.

Authority:—MS. data in Meteorological Office.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

Caution.—*See* page 69.

PLACE—ST. HELENA (JAMESTOWN). LAT. 15° 55′ S., LONG. 05° 43′ W. Height above Mean Sea Level, 40 feet (12^m2).

Climatic Table compiled from 1 to 16 Years' Observations, 1854 to 1951.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		SKY No. of days		RAIN		WIND DIRECTION																		ø Mean wind speed		No. of days with wind force 8 or more ø	No. of days with fog or mist
												0700									1200												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0930	1530	Clear less than 2/10	Cloudy more than 8/10	Average fall	No. of days with trace or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	0700	1200		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																				knots			
January	1015	80	69	83	65	63	62	6	9	0·3	4	0	0	2	79	19	0	0	0	0	0	0	5	74	21	0	0	0	0	13	11	0	—
February	1015	81	70	85	67	65	64	6	9	0·4	4	0	0	3	72	25	0	0	0	0	0	0	10	74	16	0	0	0	0	13	11	0	—
March	1015	82	71	85	67	64	61	6	8	0·8	5	0	0	2	63	35	0	0	0	0	2	1	12	67	16	0	0	2	0	13	10	0	—
April	1015	81	70	84	67	65	62	7	7	0·4	3	0	0	1	74	25	0	0	0	0	2	1	6	73	16	0	0	0	2	13	11	0	—
May	1016	76	67	80	63	72	70	4	11	0·7	4	0	0	2	63	32	0	0	0	3	0	2	11	73	14	0	0	0	0	11	11	0	—
June	1018	74	65	78	62	72	69	2	15	0·7	6	0	0	4	62	32	0	0	0	2	1	2	9	76	10	0	0	0	2	11	11	0	—
July	1019	72	63	75	60	74	71	1	19	1·3	8	0	0	2	74	19	2	0	0	3	0	0	7	76	13	0	0	2	2	13	12	0	—
August	1019	72	63	75	60	76	74	2	16	0·4	3	0	0	5	72	23	0	0	0	0	0	0	15	63	22	0	0	0	0	15	16	0·3	—
September	1018	72	63	74	61	75	69	4	11	0·2	2	0	0	3	75	22	0	0	0	0	1	2	3	67	27	0	0	0	0	17	16	0·4	—
October	1017	73	64	76	61	72	70	5	9	0·1	0·7	0	0	0	74	26	0	0	0	0	0	0	5	70	25	0	0	0	0	18	15	0·2	—
November	1016	74	65	78	63	72	69	8	6	0·0	0	0	0	2	69	27	0	0	0	2	0	0	4	71	25	0	0	0	0	16	13	0	—
December	1016	76	66	80	63	65	64	6	8	0·1	1	0	3	2	83	11	1	0	0	0	2	5	11	71	11	0	0	0	0	15	13	0	—
Means	1017	76	66	86*	59**	70	67	—	—	—	—	0	0	2	72	25	0	0	0	1	1	1	8	71	18	0	0	0	1	14	13	—	—
Totals	—	—	—	—	—	—	—	57	128	5·4	41	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—
Extreme values	—	—	—	93†	58††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	7–9					3–5		7–8		7–9		1–2																				16	—

Standard of time: local.

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature.
†† Lowest recorded temperature.

ø From observations made at Hutt's Gate, 15° 57′ S., 05° 40′ W., 2,066 feet (629^m7).

Authority:—MS. data in Meteorological Office.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

CHAPTER II

ISLANDS IN THE BIGHT OF BIAFRA

CLIMATE AND WEATHER.—*See* page 49.

Chart 594.

GENERAL REMARKS.—The islands in the Bight of Biafra, *see* page 109, are four in number, and are situated at almost equal intervals, on a line running approximately in a north-easterly and south-westerly direction through the head of the bight. Taken in the order in which they lie on this line, the north-eastern and largest island is Fernando Póo, next comes Ilha do Principe, then São Tomé the second largest, and finally Annobon the outer and south-westernmost island.

These islands, as well as the lofty mountain ranges of the mainland north-eastward of Fernando Póo, are evidently of volcanic origin, and are probably the gigantic results of one and the same submarine upheaval.

It is remarkable that these four islands, the Cameroons, Rumpi mountains and Mount Atlantica (chart 2202*a*), are all in line, apparently indicating the direction of the volcanic disturbance, the effects of which may be traced in the irregular features of the ground, marked by abrupt declensions and needle-shaped peaks; whilst the basaltic and ferruginous rocks of which the islands are composed, the black sand, as well as the scoria which is found along the shores, are all evidences of volcanic agency.

Chart 1357.

FERNANDO PÓO.—This island, which from its size and geographical position, is the most important in the Bight of Biafra, is a Spanish possession, and is situated between the parallels of 3° 11′ N. and 3° 48′ N., and the meridians of 8° 24′ E. and 8° 58′ E. *See* also page 4.

From April to September the climate is pleasantly cool and the rainfall not excessive. The average total rainfall for the year varies from 78 to 120 inches.

Temperatures vary from 61° F. to 91° F., with the extreme temperatures occurring between November and February.

In the cultivated areas, mosquitoes, tsetse fly and the phalaria fly are common up to heights of about 2,000 feet (609^{m}6), but the townships are clear of all but the mosquito and the ubiquitous sandfly.

Charts 594, 2202a, 2203, 2127.

Charts 1860, 1357.

Aspect.—A mountain ridge traverses nearly the whole island from its south-western towards its north-eastern point, and culminates in the magnificent cone of Pico Santa Isabel (*Lat. 3° 35′ N., Long. 8° 47′ E.*), the summit of which, 10,190 feet (3,105^{m}9) high, is almost continually enveloped in clouds. It has been doubted whether this volcano can yet be considered extinct, as smoke issuing from it is said to be seen occasionally, but the highest parts, composed of volcanic scoria, have been so far decomposed as to be covered with a grassy vegetation. There are also two smaller peaks near the south-western extremity of the island, but of diminutive height when compared with their stupendous neighbour.

When seen from seaward, the island of Fernando Póo presents a beautiful appearance. Pico Santa Isabel is visible from westward on a clear day, or after a Tornado, at a distance of 100 miles.

The weather, however, is sometimes so thick and hazy that the land cannot be seen, and as the easterly current is strong, vessels might pass the island without sighting it. Approaching from westward therefore, it is absolutely essential, in these circumstances, that soundings should be taken frequently.

The channel separating Fernando Póo from the base of the Cameroons mountains on the mainland, *see* page 109, is 17 miles wide. *See* views facing pages 88 and 112.

Currents.—The currents in the vicinity of Fernando Póo are very variable and require closer observation than has as yet been bestowed upon them. *See also* page 29.

The Guinea current, which is so continuous and rapid towards the Bight of Biafra, impinges upon the coast of Fernando Póo, and the island is therefore to a certain extent, within its influence.

As a rule, during the winter months the currents appear to set northward along the western coast, eastward along the southern coast and southward along the eastern coast, at the rate of from one knot to 2 knots ; during the summer they appear to set northward along the eastern and western coasts, and westward along the southern coast. They are, however, variable in this locality, and cannot be depended upon.

Along the northern coast the general direction of the current is eastward and its velocity is variable, but it often runs at the rate of 1½ knots. It should be particularly guarded against when approaching Bahia de Santa Isabel at night, *see* page 87.

Chart 1860.

Northern side of Fernando Póo.—Coast.—Light.—Punta Europa (Cabo Formoso) (*Lat. 3° 48′ N., Long. 8° 43′ E.*), the north-western extremity of Fernando Póo, is a salient point of moderate height surmounted by a large number of remarkable, tall trees. Numerous rocks, most of which are above water, lie close inshore round its base, but there are no off-lying dangers.

A light is exhibited, at an elevation of 259 feet (78^{m}9), from a white framework tower, painted with red horizontal stripes, situated on Punta Europa. When bearing less than 073°, the light is obscured by trees.

From Punta Europa, the northern coast of the island trends east-south-eastward for about 1½ miles, to Punta Linslager, and then turns abruptly southward for about 1¼ miles.

Charts 1357, 594, 2202a, 2203, 2127.

Chart 1860.

Rada de Santa Isabel is the name given to the indentation in the coast between Punta Linslager and Punta Fernanda, situated about 4 miles east-south-eastward of it.

From a point about 1¼ miles southward of Punta Linslager the coast trends eastward for about 2 miles to Punta Chacon.

Chart 1357, plan of Santa Isabel and adjacent bays.

The eastern end of Rada de Santa Isabel contains three small bights, named respectively Ensenada de Gravina, Ensenada de Venus, and Bahia de Santa Isabel.

Ensenada de Gravina is contained between Punta Chacon and Punta Pilon situated about one mile east-south-eastward. The bay is fronted by a shelf with depths of less than 3 fathoms ($5^{m}5$) over it, which extends as much as 1½ cables offshore.

A spit, with depths of less than 3 fathoms ($5^{m}5$) over it, and with a least depth of 3 feet ($0^{m}9$), rock, extends about three-quarters of a cable northward of Punta Pilon (*Lat. 3° 45′ N., Long. 8° 47′ E.*).

Ensenada de Venus is contained between Punta Pilon and Punta Cristina, about 3½ cables east-north-eastward. At the head of the bay, a freshwater stream, Cockburn brook, flows through a sandy beach. The shores of the bay are mostly high, rocky and steep and are fringed with rocks both above and below water.

Depths of less than 3 fathoms ($5^{m}5$) extend as much as three-quarters of a cable off Punta Cristina, which is the northern extremity of a bluff peninsula terminating in vertical cliffs. Steps have been made for the purpose of ascending to the summit, which is high and wooded.

Anchorage.—Rada de Santa Isabel affords good anchorage, and vessels intending to remain for any length of time will do well to anchor in Ensenada de Gravina, the further offshore the better, as it is cooler there than if closer in, and the vessel will be free from mosquitoes. The anchorage in this roadstead is preferred by many to that in Bahia de Santa Isabel.

A good berth will be found half a mile offshore in a depth of about 17 fathoms ($31^{m}7$). An inshore berth is specially undesirable during the Tornado season, as these winds frequently blow directly towards the land.

Anchorage may also be obtained about one mile west-north-westward of Punta Chacon.

Islotes de Enrique.—Dangers.—Light-buoy.—These islets consist of three large rocks, 40 to 45 feet ($12^{m}2$ to $13^{m}7$) high. The eastern and largest of the group is situated about one cable north-north-westward of Punta Cristina (*Lat. 3° 46′ N., Long. 8° 47′ E.*), and a channel about one-third of a cable wide, between depths of 3 fathoms ($5^{m}5$), runs between the islets and the point.

The sandbank on which the islets lie extends about one cable westward of the western islet, and about a quarter of a cable off the eastern islet. A detached shoal, with depths of less than 3 fathoms ($5^{m}5$) over it, lies about one cable east-north-eastward of the eastern islet.

A light-buoy, painted black, and exhibiting a *green flashing* light *every three seconds,* is moored in a position about 1¼ cables northward of the eastern extremity of the eastern islet.

Bahia de Santa Isabel.—Dangers.—Light-buoy.—Quay.—This bay is contained between Punta Cristina and Islotes de Enrique on the south-westward, and Punta Fernanda which is situated about 5 cables north-eastward of Punta Cristina, on the north-eastward. From its semi-circular form and the nature of its shores, which are composed of steep, rocky cliffs, from about 100 to 200 feet (30^m5 to 61^m0) high, it is evident that the bay is the crater of an extinct volcano. *See* view facing page 88.

Punta Fernanda (*Lat. 3° 46′ N., Long. 8° 48′ E.*) is the extremity of a narrow rocky peninsula which extends in a north-westerly direction from the coast; a shoal spit, over which the depths are less than 3 fathoms (5^m5), extends about 2½ cables north-westward of the point.

A light-buoy, painted red, and exhibiting a *red flashing* light *every three seconds* is moored in a position about 2¾ cables westward of Punta Fernanda, and marks the western extremity of the shoal spit.

A 6-fathom (11^m0) patch exists in a position about 3¾ cables west-north-westward of Punta Fernanda, and in 1935 a shoal with a depth of 4¼ fathoms (7^m8) over it, was reported in a position about 2½ cables westward of the same point.

There is an obelisk near the extremity of Punta Fernanda, which is useful as a mark for entering the bay. A monument stands about one cable south-eastward of the extremity of this point.

The cathedral, which stands near the edge of the cliff at the head of the bay, is conspicuous; it has two lofty spires at its eastern end, which in line bear about 150°. The hospital, which has a red roof, stands close to the cathedral. The position of the hospital is not indicated on the charts.

Government house is a long, two-storied building, the next eastward of the cathedral; in common with almost every house in Santa Isabel, it has a flagstaff.

There is a quay about 900 feet (274^m3) long, at the head of the bay, with depths alongside of from one to 6 fathoms (1^m8 to 11^m0). From the centre of the quay a concrete pier, about 90 feet (27^m4) long, extends at right angles with a depth of about 11 feet (3^m4) at its head; there are steps on either side of the root of the pier with depths of about 1½ feet (0^m4) alongside them.

A new wharf was under construction, in 1950, south-eastward of Punta Cristina.

Moorings for the use of lighters and other small craft are laid on either side of the pier, parallel with, and at a distance of half a cable from the shore.

Lights.—Beacons.—A light is exhibited from a concrete pillar painted with black and white bands, situated near the root of the pier (*Lat. 3° 46′ N., Long. 8° 48′ E.*).

A light is exhibited, from a concrete pillar painted with black and white bands, standing on the cliff close to the south-western angle of the hospital, and 50 yards (45^m7) from the front light.

These lights in line, bearing 122½°, lead into the bay.

The light-structures are difficult to distinguish by day, and the front one is frequently obscured by vessels lying off the pier. Between the leading lights there is a conspicuous notice board.

Two *red* lights are exhibited, if a request is made by radio prior to arrival, from two beacons, about 250 feet (76^m2) apart, situated about one cable inside Punta Cristina. These lights, when in line bearing 221°, indicate positions for vessels to let go their first anchor

Chart 1357, plan of Santa Isabel and adjacent bays.

if securing with their sterns to the pier. By day this line of bearing is indicated by two black and white discs, the front one on a building and the rear one on a wooden post.

Anchorage.—In Bahia de Santa Isabel, anchorage is perfectly safe, even as a rule from Tornadoes, whilst the smooth water, and tidal rise of 7 feet (2^{m}1), admit of small vessels being beached for repairs without danger; the high cliffs, however, exclude the breeze and render the anchorage hot and unhealthy.

Difficulty is frequently experienced in identifying the land in the vicinity of Bahia de Santa Isabel from the offing, in consequence of the coast being backed by high land; this is particularly the case with Islotes de Enrique. The town, however, can be easily seen at a distance of from 5 to 10 miles; it is the only town on the northern coast of Fernando Póo and the buildings show up well, especially the water tower when approaching from the eastward, and the cathedral when approaching from the westward.

Santa Isabel.—Port facilities.—The town, which, in 1951 had a population of 9,000, is situated on a plateau at the top of the cliffs forming the head of the bay.

The native inhabitants have English names but are of African origin, probably being descendants of the natives converted by the Baptist missionaries in the first half of the nineteenth century, or of negroes sent over from the United States of America on the abolition of slavery.

A British Consular officer is stationed at Santa Isabel.

A very small quantity of coal is kept in stock.

Fresh water may be obtained from a hydrant on the pier.

Small repairs can be effected, and there is a small slipway capable of lifting craft up to 50 tons deadweight.

Fresh provisions can be obtained.

There are two 3-ton travelling-cranes on the pier.

About 7 small lighters are available.

There is a radio station at Basilé, which is situated inland, about 2 miles south-westward of Punta Fernanda. *See* page **44.**

There is telephone communication with Basilé and San Carlos.

Good roads connect Santa Isabel with other parts of the island.

There is regular steamship communication with Europe and air lines connect with Spanish Guinea and with Douala, three or four times a week.

Chart 1860.

Coast.—Eastward of Punta Fernanda (*Lat. 3° 46′ N., Long. 8° 48′ E.*), the northern coast of Fernando Póo trends eastward for about 8½ miles to Punta Hermosa, the north-eastern point of the island; throughout the whole of this distance, the coast is rocky and indented by numerous small coves; it is well wooded and without any known off-lying dangers, being steep-to with depths of 26 to 28 fathoms (45^{m}5 to 51^{m}2) within a distance of one mile offshore. Vessels sometimes anchor off the coast about 3 or 4 miles eastward of Punta Fernanda, but towards Punta Hermosa the depths become greater, and Tornadoes blow violently all along this coast though not for sufficient time to raise much sea.

Bahia de Nervion is entered between Punta Fernanda and Punta del Almirante, about one mile eastward; at its head are several small

Chart 1860.

coves. A shoal extends for half a cable from Punta del Almirante, which point is remarkable from having a large tree on its extremity.

Chart 1357, plan of Santa Isabel and adjacent bays.

Arroyo del Consul is a small stream which flows through a valley on the south-eastern side of the Santa Isabel plateau, and enters the sea in Ensenada del Consul, a shallow cove immediately eastward of Punta Fernanda.

Eastward of the mouth of this stream is Punta Consul, a low rounded point situated on the western side of Ensenada Horton or San Nicolas, in which there is a sandy beach through which flows Arroyo de San Nicolas, a similar stream to Ensenada del Consul, but with a waterfall 50 feet (15^{m}2) high, about a quarter of a mile from its mouth.

Chart 1860.

Punta de Gandara is situated about 1¾ miles eastward of Punta del Almirante, with Punta de San Jose about 2½ miles farther eastward.

Eastern coast of Fernando Póo.—Light.—Punta Hermosa, the north-eastern point of Fernando Póo, is round, sloping, and wooded, with hills rising behind it ; rocks lie close inshore round its base and there is deep water close off it. At night or in thick weather vessels should be cautious in passing this point, for the soundings give no warning of its proximity, and the high land behind the point makes it difficult to judge the distance off it.

Islote de Horacio is situated close off Punta Hermosa and shows up distinctly as an island when rounding the point at a distance of two miles.

A light is exhibited at an elevation of 72 feet (21^{m}9) from a white tower, 52 feet (15^{m}8) in height, situated on Islote de Horacio (*Lat. 3° 46′ N., Long. 8° 57′ E.*).

Charts 1860, 1357.

From Punta Hermosa, the eastern coast of Fernando Póo takes a general south-south-easterly direction for about 7 miles to Punta Vidal, and thence continues, almost in a straight line, in a south-south-westerly direction for about 30 miles, as far as Cabo Agudo, the south-eastern point of the island. The whole of this coast is abrupt and indented, and consists of a succession of points fringed with rocks close inshore, between which are coves.

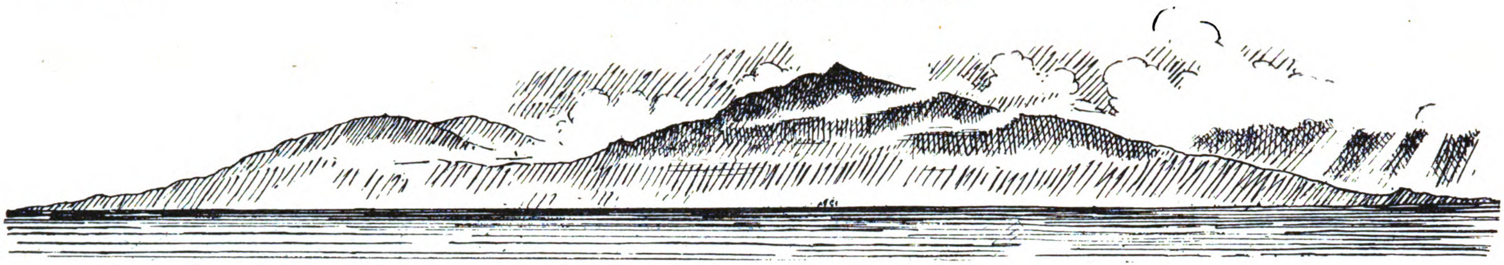
This side of the island is but little frequented in consequence of there being no good anchorages, and because a sailing vessel, or a steam vessel of low power, caught here in a Tornado, would be in a position of great danger without a place of refuge.

Chart 1860.

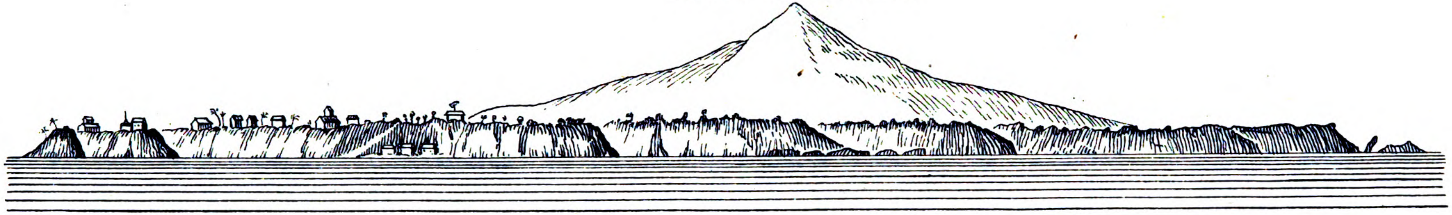
Ensenada de los Pajaros is contained between a point situated about 1½ miles south-south-eastward of Islote de Horacio, and Punta de Moreno, 1½ miles further south-south-eastward.

Punta de la Cruz, situated about one mile south-south-eastward of Punta de Moreno, is the easternmost point of Fernando Póo, and has some sunken rocks lying off it. Ensenada de la Cruz is contained between Punta de la Cruz and a point about one mile southward, which latter point also forms the northern entrance point of Ensenada del Corral.

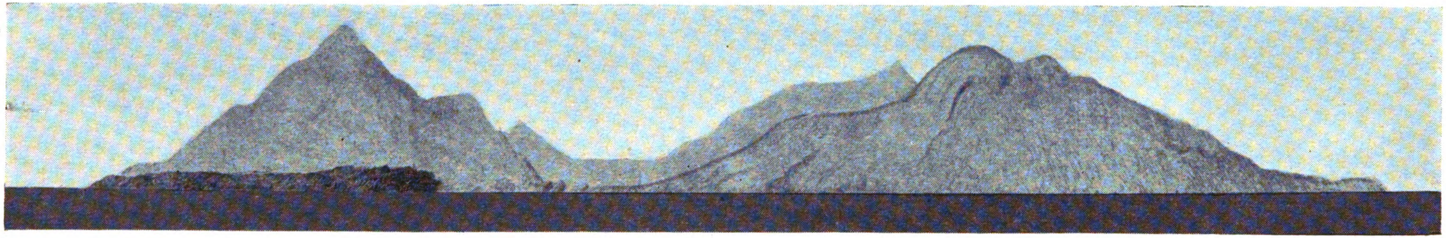
Punta Vidal is situated about 3¼ miles southward of Punta de la Cruz ; Ensenada Armero lies close north-westward of Punta del


Pico Santa Isabel, bearing 273°, distant 27 miles.

Fernando Póo from eastward.
(*Original dated* 1836.)

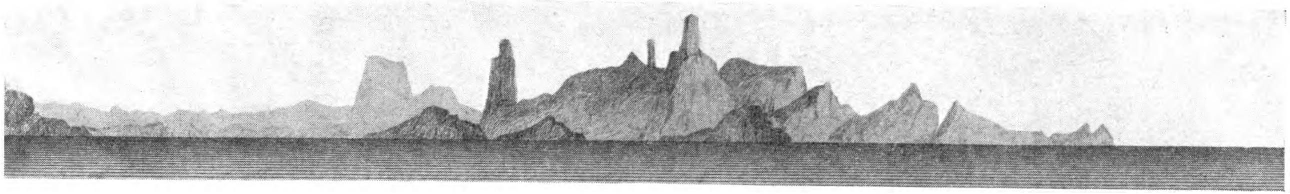

Pico Santa Isabel, bearing 183°.
Punta Fernanda lighthouse.
Santa Isabel.
Punta Cristina.
Islotes de Enrique.

Bahia de Santa Isabel from northward.
(*Original dated* 1871.)

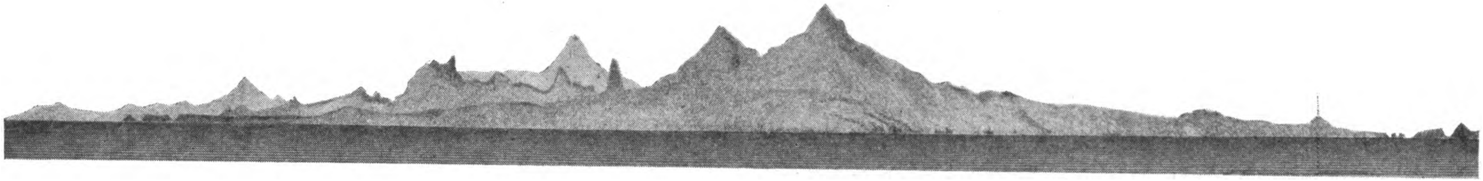

Pico Santa Isabel.
Bahia de San Carlos.

Fernando Póo from westward.
(*Original dated* 1871.)

To face page 89.


Ponta Iola.
Carriote peak.
Pico do Principe.
Ponta do Focinho de Cão.
Ponta do Grosso.

Baia das Agulhas, Ilha do Principe, from westward.
(*Original dated* 1846.)


Ilhéu de Sant'Ana, bearing 226°.
Pico Maria Fernandes.
Pico de São Tomé.
Baia de Ana de Chaves.
Ilhéu das Cabras, bearing 277°, distant 12 miles.

São Tomé from north-eastward.
(*Original dated* 1871.)

Chart 1860.

Fronton, situated about 4½ miles south-south-westward of Punta Vidal.

Cala de San Juan lies about 2½ miles south-westward of Punta del Fronton, and Punta de Leven (*Lat. 3° 29′ N., Long. 8° 53′ E.*) is situated about 4¼ miles farther south-south-westward.

Islote de Caracas, situated about 1½ miles southward of Punta de Leven, is of small extent and moderate elevation ; it lies within half a mile of the coast from which it does not stand out clearly when viewed from the eastward. A depth of 30 fathoms ($54^{m}9$) will be found about half a mile north-north-westward of the islet, and 16 fathoms ($29^{m}3$) about one mile south-eastward of it.

South-westward of Islote de Caracas is Ensenada Alicia, which appears to be clear of dangers, but the points on either side of it are fringed with rocks ; on the shores at the head of the cove are some factories.

Chart 1357.

Fronton de Caracas is situated about 2¼ miles south-westward of Islote de Caracas.

Bahia de la Concepcion is entered between Punta de los Cañones, situated 5¾ miles south-south-westward of Punta de Leven, and Punta Concepcion about 2½ miles further southward. This bay, into which flow several streams, is quite exposed to easterly winds which may be strong during a Tornado, and the bank, on which anchorage can be obtained by vessels with local knowledge, is very narrow. The village of Concepcion is situated near the head of the bay.

From Punta Concepcion, the coast as far as Cabo Agudo (*Lat. 3° 12′ N., Long. 8° 44′ E.*) is indented. Punta del Salvador is situated about 3½ miles south-south-westward of Punta Concepcion, with Punta de la Soledad and Punta Jesusa, 2 and 5½ miles respectively, further south-westward.

Chart 1860.

Western side of Fernando Póo.—Coast.—Islets.—Dangers.— From Punta Europa the coast runs in a south-south-westerly direction, Cabo Prior, Punta Lucinda, and Punta Beecrof being situated, respectively, 2, 4 and 5½ miles from Punta Europa.

Punta Achada, which forms the southern entrance point of Ensenada de Botenos, is situated about 4½ miles south-south-westward of Punta Beecrof.

A rocky shoal, about three-quarters of a mile in extent, with a depth of 31 feet ($9^{m}4$) over it, and 16 fathoms ($29^{m}3$) all round, lies about one mile northward of Punta Achada (*Lat. 3° 39′ N., Long. 8° 37′ E.*).

Islotes los Primos are three above-water rocks, standing on a reef which is about 6 cables in length in a north-north-easterly and opposite direction, but very narrow and steep-to all round. They lie about 1½ miles offshore and 3 miles south-westward of Punta Achada, and between them and the coast are depths of from 14 to 20 fathoms ($25^{m}6$ to $36^{m}6$).

A rock with a depth of less than 6 feet ($1^{m}8$) over it, the position of which is approximate only, is charted about 2¼ miles northward of Islotes los Primos. A rock, with a depth of less than 6 feet ($1^{m}8$) over it, the position of which is doubtful, is charted about three-quarters of a mile north-eastward of Islotes los Primos.

Chart 1357, plan of San Carlos bay.

Punta de San Joaquin is situated about 2¾ miles south-south-westward of Punta Achada, with Punta de Ulloa a further 2½ miles in the same direction.

Islote Loros, of moderate height, is situated about 2 miles south-westward of Punta de Ulloa and about 1½ miles northward of Punta de Cabras, the northern entrance point of Bahia de San Carlos. About 3 cables inshore of Islote Loros is Islote Kid, which is the smaller of the two, and at about the same distance north-eastward of Islote Kid is a low rock surrounded by breakers. The coast recedes abreast those islets, forming a bay with a sandy beach, broken here and there by rocks; the islets afford convenient shelter and anchorage may be obtained, by vessels with local knowledge, on the south-eastern side of Islote Loros at a distance of about 4 cables from it.

Light.—A light is exhibited, at an elevation of 36 feet ($11^{m}0$) from a red tower, 13 feet ($4^{m}0$) in height, situated on Islote Loros.

Bahia de San Carlos.—Light.—This bay is entered between Punta de Cabras and Punta de San Carlos, situated about 6 miles south-westward.

Punta de Cabras is a rounded sandy point, fringed with rocks, and rises gently to Cerro le San Augusto, a hill of moderate elevation. From this point the coast runs south-eastward for about 3 miles, and then curves south-westward for about 3 miles further, forming the head of the bay. Here it consists of a beach of black sand, fronting a plain, which latter is watered by several streams and is cultivated. There are several factories and sheds built along this beach, and near its northern end is Rio Marivood, the largest of the streams mentioned above.

A light is exhibited in the small settlement known as Pescadores (*Lat. 3° 27′ N., Long. 8° 34′ E.*), situated at the south-western corner of the head of the bay, in a position about 5 miles south-south-westward of Punta de Cabras.

An islet, which lies about half a mile offshore and is surrounded by a rocky bank extending from the land, is shown on the chart about one mile north-north-westward of Pescadores light. From abreast this islet the coast trends west-north-westward for about one mile to Punta de Ceres, and thence westward for about 2¾ miles to Punta de San Carlos. This coast is moderately high and is indented by several small bays, and covered with forest. The salient points are fringed with rocks extending for a short distance seaward of them, but otherwise the coast is clear of dangers.

Anchorage.—Directions.—Bahia de San Carlos is to be preferred as an anchorage to Bahia de Santa Isabel, as it is commodious and can be easily entered; it is also without off-lying dangers, and is well sheltered from the prevailing winds with the exception of the squalls which come down from the mountain sides.

The best anchorage for vessels of deep draught is in from 16 to 20 fathoms ($29^{m}3$ to $36^{m}6$), with Islote Loros in line with Punta de Cabras bearing about 352°, and Punta de San Carlos bearing about 258°; anchorage is also shown on the chart about 4 and 14 cables north-westward of this position. Small vessels can go further in, southward of the Rio Marivood. There is excellent landing for boats on a sandy beach.

Charts 594, 2202a, 2203, 2127.

Chart 1357.

Approaching Bahia de San Carlos from the westward, the island of Fernando Póo, when first seen, appears as two peaks; the northernmost and highest being Pico de Santa Isabel, and the southernmost, also very high, having a rounded summit, whence its sides slope gradually towards the sea. *See* view facing page 88.

Coast.—From Punta de San Carlos, the coast runs south-westward for about 4 miles to Punta Enriquez (Chart 1860), thence a further 3 miles to Cabo Redondo, and then southward for 2½ miles to Punta Sagres, the westernmost point of the island, which is high, bluff, and wooded, with deep water close-to. The coast is high and is fringed with rocks close inshore, but is otherwise clear of danger.

Southern side of Fernando Póo.—This precipitous coast extends for about 21 miles in an east-south-easterly direction from Punta Sagres to Cabo Agudo. It presents the same characteristics as does the eastern coast of the island, and it is also little frequented, as the shallow indentations offer no shelter whatever from winds between south-east and south-west, which sometimes raise a heavy sea.

Charts 1357, 1361.

Punta Oscura, situated about 3½ miles south-eastward of Punta Sagres, is the most prominent point on this coast, and has a waterfall in its vicinity (*Lat. 3° 17′ N., Long. 8° 26′ E.*).

Along this coast the land rises very steeply inland from the cliffs. Two peaks, each about 1,359 feet ($411^{m}5$) high, overlook the coast near Punta Owen, situated about 5¼ miles east-south-eastward of Punta Oscura.

At about 5½ miles northward of Punta Dolores, which is situated nearly midway between Punta Owen and Cabo Agudo, the mountains attain a height of 6,889 feet ($2{,}099^{m}8$).

Cabo Agudo is high and rocky, and is dominated by a peak 1,565 feet ($477^{m}0$) high; the point is densely wooded above the cliffs which form the coastline, and round its base are rocks on which the sea breaks.

Chart 1595, plan of Ilha do Principe.

ILHA DO PRINCIPE.—This island, which is situated about 120 miles north-westward of Cabo San Juan, the nearest point on the coast of Africa, and about 116 miles south-westward of Fernando Póo, is a Portuguese possession, and is, in its physical features and aspect, one of the most remarkable in the world. It lies between the parallels of 1° 42′ N. and 1° 32′ N., and the meridians of 7° 20′ E. and 7° 28′ E. *See* page 9.

Depths of 100 fathoms ($182^{m}9$) approach to within about 3 miles off the northern and eastern sides of the island, but a bank, over which the depths are less than 100 fathoms ($182^{m}9$), extends upwards of 12 miles in a south-westerly direction from it; the islets known as Pedras Tinhosas, *see* page 97, are situated near the south-western extremity of this bank.

Caution.—It should be borne in mind when navigating in the vicinity of Ilha do Principe, that the chart is based on a very old survey.

Aspect.—The general aspect of the island, though resembling in some respects that of Fernando Póo, is more singular in outline on account of the needle-shaped peaks and leaning mountain masses

Charts 594, 2202a, 2203, 2127.

Chart 1595, plan of Ilha do Principe.

which rise abruptly from the high land of the interior, thus imparting to it a most picturesque appearance; but as the soil is exceedingly prolific, the luxuriant vegetation which everywhere abounds becomes rank to such a degree as to cause the island to be unhealthy. In many parts there are traces of extinct volcanoes, and large tracts are covered with volcanic stones.

The northern part of the island though high, is not so grand in appearance when compared with the southern portion, which latter consists of a series of steep and rugged mountains, surrounded by gigantic natural obelisks of most fantastic shapes, the whole culminating in Pico do Principe (*Lat. 1° 36′ N., Long. 7° 24′ E.*). *See* views on chart 1595 and facing page 89.

Pedra da Galé.—This small, bare, black rock of basaltic formation, on which the sea always breaks, lies about 2 miles north-westward of Ilhéu Bombom, the northernmost point of Ilha do Principe; as it is very steep-to and only 9 feet ($2^{m}7$) high, it is very dangerous. This danger is covered by the *red* sector of Ilhéu Bombom light between the bearings of 124° and 154°. The depths in the channel between the rock and the islet, which is free from any known danger, are greater than 10 fathoms.

Ilhéu Bombom.—Light.—This so-called islet is in reality the extreme northern point of Ilha do Principe, being connected to the mainland by a sandy spit, on the western side of which are two small rocky islets.

Ilhéu Bombom is about 194 feet ($59^{m}1$) high, densely wooded, round in shape, and steep-to on its seaward side, against which the sea frequently breaks.

A light is exhibited, at an elevation of 211 feet ($64^{m}3$), from a white, quadrangular, iron tower, 11 feet ($3^{m}4$) in height, situated on the summit of the island.

Northern side of Ilha do Principe.—Between Ilhéu Bombom and Ponta da Praia das Burras, situated about 2 miles east-south-eastward from it, the coast recedes to form a bay, the well-wooded shore of which is mostly rocky, with here and there small sandy bights.

Ponta da Praia das Burras, is high, rocky, and steep-to; it falls on its inshore side to a low neck, and this, when viewed from a distance, causes the point to assume the appearance of being detached. On the hills which skirt the coast within the point, are some native huts, partially concealed by foliage, and immediately eastward of the point is a small sandy bay.

From Ponta da Praia das Burras the coast trends east-south-eastward for about 1½ miles to Ponta dos Mosteiros, the north-eastern point of the island, and consists of cliffs of moderate height against which the sea often breaks with violence.

Anchorage.—Good anchorage may be obtained, by vessels with local knowledge, in the bay between Ilhéu Bombom and Ponta da Praia das Burras in depths of about 8 or 9 fathoms ($14^{m}6$ or $16^{m}5$), mud and gravel.

Chart 1595, plan of Baia de Sto. Antonio.

Eastern side of Ilha do Principe.—Coast.—Close off Ponta dos Mosteiros is a black rock, and at about half a mile in a north-easterly direction from the point is a group of bare rocks known as Ilhéus dos Mosteiros, which are connected to it by a shoal bank. The largest

Chart 1595, plan of Baia de Sto. Antonio.

of these rocks has a depth of from 4 to 5 fathoms (7^m7 to 9^m1) close to its northern, eastern, and southern sides. Within the islet, lying in a westerly direction from its northern end, are two small rocks above water. There is a rock with a depth of less than 6 feet (1^m8) over it, and other rocks with 2 fathoms (3^m7) over them, and on which the sea breaks, between Ilhéus dos Mosteiros and the point of the same name.

Diamond rock (*Lat. 1° 41′ N., Long. 7° 29′ E.*), a small, low, above-water rock, surrounded by several sunken rocks on which the sea breaks heavily, lies about one cable south-eastward of the largest of Ilhéus dos Mosteiros.

This rock should not be rounded on its eastern side at a distance of less than 4 cables, where the depths will be about 30 fathoms (54^m9) and caution is necessary as the current sometimes sets strongly to the northward from off Ponta Capitão.

Ponta Coquiero is situated about 3 cables south-south-eastward of Ponta dos Mosteiros and forms the northern entrance point of Baia das Cabras, a shallow rocky bay, at the southern point of which is Ponta Capitão. This coast is rocky and fringed with breakers.

Baia de Santo Antonio.—This bay, the most important in Ilha do Principe, is entered between Ponta Capitão and Ponta da Garça (Graça), situated about 2½ miles southward of it. The inner part of the bay is not easily distinguished from seaward, and at its head is the town of Santo Antonio. The shores of the bay are rocky with numerous sandy coves.

The great objection to this bay as an anchorage is that it is exposed to easterly and south-easterly winds, from which quarters the Tornadoes blow; but the holding-ground is such that vessels may remain at anchor in safety, provided that their ground tackle be good.

The tidal streams are weak at all times.

Ponta Capitão is a narrow tongue of land which is steep-to, and not only forms the northern entrance of Baia de Santo Antonio, but also the eastern entrance point of Baia de Formiga; this latter is a small bay within Baia de Santo Antonio, with Praia Grande, a sandy beach through which runs a small stream, at its head.

Ilhéu Santana, 65 feet (19^m8) high and covered with brushwood, lies close off the western entrance point of Baia de Formiga.

As the bottom in Baia de Formiga is composed of coral and shells, and as the bay is open to the south-eastward, it would be imprudent to anchor in it during the Tornado season.

From the western entrance of Baia de Formiga, the northern shore of Baia de Santo Antonio trends for about 2 miles in a general south-westerly direction to the head of the latter, and is composed partly of rocky cliffs above which the land rises abruptly, and partly of small sandy coves between rocky points, where landing may be effected and behind which the land is generally high and wooded.

Northward of the town are the ruins of a large house named Casa Fereira.

From Ponta da Garça (*Lat. 1° 38′ N., Long. 7° 28′ E.*), a rounded rocky headland, the southern shore of Baia de Santo Antonio trends in a general north-westerly direction, with two deep indentations in it, for about 2 miles to Ponta da Mina, and thence south-westward for about one mile to the head of the bay.

Chart 1595, plan of Baia de Sto. Antonio.

Half a mile north-westward of Ponta da Garça is Ponta do Abade, off which a reef extends for a short distance.

Praia do Abade (Bado) and Praia Salgada are sandy beaches separated by a rocky cliff at the head of a bay, about 3 cables wide, which is entered between Ponta do Abade and Ponta da Praia Salgada. Rocks lie off Praia do Abade, and there are some houses on Praia Salgada, and also a few on Praia do Abade.

Ponta da Praia Salgada is moderately steep-to, and from it the high, rocky, wooded coast curves westward for about 3 cables to Ponta de Risco. Off this latter point some sunken rocks, upon which the sea sometimes breaks, extend about half a cable.

Between Ponta de Risco and Ponta da Mina there is a bay, the shores of which are high and wooded, with sandy beaches separated by rocky points; the south-eastern beach is Praia Pequena, where there is a large house with a fresh-water stream near it, and the other two are named respectively Praia Baleia (Baloa) and Praia Evora.

Ponta da Mina, from which rocks extend eastwards for half a cable, is a prominent rocky point on the summit of which stands an ancient fortress, the ramparts of which now enclose the gardens of Government house, and also the light tower.

From Ponta da Mina, the coast trends south-westward for about one mile to the head of the bay.

Within a line joining Ilhéu Santana and Ponta da Praia Salgada, the depths in the bay are mostly less than 6 fathoms (11^{m}0), and within Ponta da Mina they are under 3 fathoms (5^{m}5).

The head of the bay dries for a distance of up to 1½ cables offshore.

Lights.—A light is exhibited, at an elevation of 112 feet (34^{m}1), from a framework structure surmounting a zinc-covered hut, situated on Ponta da Garça.

A light is exhibited, at an elevation of 174 feet (53^{m}0), from a red quadrangular structure, 25 feet (7^{m}6) in height, erected within the fortress on Ponta da Mina. The light is visible from 230° through West, to 295°.

Shoals.—Buoy.—A shoal, over which there is a least depth of 2½ fathoms (4^{m}6), lies about 4 cables north-westward of Ponta da Mina; a shoal over which there is a depth of 2¾ fathoms (5^{m}0) lies about 5 cables northward of the same point. A red spherical buoy is moored close southward of this latter shoal. A 6¼-fathom (11^{m}4) patch exists about 2½ cables south-eastward of Ilhéu Santana.

Prohibited anchorage.—Owing to the existence of submarine cables, anchorage is prohibited southward of an imaginary line drawn in a 090° direction from a point on the coast about 6¼ cables north-eastward of the ruins of Casa Fereira (*Lat. 1° 39′ N., Long. 7° 26′ E.*).

Anchorage.—Good anchorage may be obtained, in depths of from 5½ to 10 fathoms (10^{m}1 to 18^{m}3), eastward of an imaginary line joining Ilhéu Santana and Ponta da Mina, but care must be taken to avoid anchoring on a rocky bottom.

There is also anchorage, in depths of from 6 to 7 fathoms (11^{m}0 to 12^{m}8), good holding ground, with the light-structure on Ponta da Mina bearing 192°, distant 5 cables, but the 2¾ fathom (5^{m}0) shoal is distant only about one cable from this position.

Santo Antonio.—Jetty.—This small town, standing on a low marshy plain between two streams known as Ribeira Frades and

Charts 594, 2202a, 2203, 2127.

Chart 1595, plan of Baia de Sto. Antonio.

Ribeira Papagaio, is sometimes inundated by the sea. It is sheltered by high, wooded hills, and is so damp as to necessitate building the houses, which are constructed of wood, on piles. The salubrity of the place may be estimated by its position in a hot and humid climate.

In 1941, there were about 50 Europeans resident in the town, and a further 30 in the remainder of the island.

The Administrator resides here.

Landing may be easily effected at the pier, situated near the ruins of Casa Fereira (*Lat. 1° 39′ N., Long. 7° 26′ E.*), which, in 1936, had a depth of 6 feet ($1^{m}8$) alongside, and also at a stone jetty about one cable south-westward of the pier, which had a depth of about 2 feet ($0^{m}6$) alongside; the pier was then in a state of disrepair, and the stone jetty was used by lighters.

There is one 2-ton crane.

Provisions are not easily obtainable, but fish may be caught with the seine.

From Santo Antonio, roads and light railways extend to various parts of the island.

There is regular, but not frequent, steamship communication with Europe.

Radio station.—There is a radio station, situated about one mile south-westward of the town; *see* page 44.

Chart 1595, plan of Ilha do Principe.

Coast.—From Ponta da Garça, the eastern coast of Ilha do Principe trends for about 2 miles south-westward and thence 3 miles southward to Ponta da Mãe Baleia, forming Broad bay, the waters of which have not been surveyed. The shores of this bay are composed of high rocky cliffs, many of which have red patches on them. At a short distance northward of Ponta da Mãe Baleia is the point of junction of two mountain ranges which cross the island; their fall southward is very sudden and the land in their vicinity rises abruptly from the sea.

Ponta da Mãe Baleia is steep-to, but about one mile northward of it, a group of rocks extends about half a mile offshore. Westward of the point is a small bay with a sandy beach, known as Praia Grande, and beyond this the high rugged coast extends southward for about 1½ miles to Ponta do Pico Negro.

Ponta do Pico Negro, the southern extremity of the island, is a long narrow tongue of land with steep cliffs on both its sides, and off its extremity is a sunken rock upon which the sea usually breaks.

Ilhéu Caroço.—This islet, situated about 1½ miles south-eastward of Ponta do Pico Negro (*Lat. 1° 31′ N., Long. 7° 26′ E.*), is 981 feet ($299^{m}0$) high, steep, rocky and covered with trees and brushwood. It is of a peculiar shape, resembling a mitre, on account of which it is also known as Dutchman's Cap. When seen from southward, it appears as part of Ilha do Principe; it is very steep-to, and in the channel between it and the island, which is clear of known dangers, the depths are from 25 to 30 fathoms ($45^{m}7$ to $54^{m}9$), fine black sand. On the southern side of Ilhéu Caroço, and close to it, is a low rock which shows up when seen on an easterly or westerly bearing.

Western side of Ilha do Principe.—Coast.—Anchorage.—Ponta da Hora (*Lat. 1° 42′ N., Long. 7° 24′ E.*) lies about 7 cables south-westward of Ilhéu Bombom, and between the two is a small bay.

Baia Mãe Marta is entered between Ponta da Hora and Ponta Mãe

Chart 1595, plan of Ilha do Principe.

Marta, situated about 1½ miles south-westward. The chart shows several rocks fringing the shore of the bay, and at its head are numerous small streams and a house surrounded by some huts.

Baia Mãe Marta is clear of dangers, sheltered from the prevailing wind, and affords good anchorage; its only drawback being that, in common with all the bays of the island, it is subject to alternate calms and violent squalls, occasioned by the proximity of the mountains.

About 8 cables southward of Ponta Mãe Marta is Ponta do Brogado Pequeno; the coast between them is fringed by rocks close inshore, but it is otherwise clear of off-lying dangers, and there are depths of 9 to 12 fathoms (16^{m}5 to 21^{m}9) close to it.

Ponta da Pedro Furada, so called because an arch has been formed at its extremity by the action of the sea, lies about one mile southward of Ponta do Brogado Pequeno; southward of this is a small sandy bay, the southern entrance point of which is Ponta Iola (Pico Padrim), a steep rocky point at the north-western termination of the central chain of mountains.

Chart 1595, plan of Baia das Agulhas.

Baia das Agulhas.—This bay affords the safest and best anchorage in the island, especially during the Tornado season, being sheltered from south-easterly winds. It is entered between Ponta Iola and Ponta do Focinho de Cão, about 3 miles south-westward.

At about one cable southward of Ponta Iola (*Lat. 1° 39′ N., Long. 7° 23′ E.*), and about three-quarters of a cable offshore, is a small rocky islet, called Pedrim.

When seen from the offing, the bay presents a remarkable aspect, as five hills lie close to its shore, and, being connected by low ground which cannot be seen from afar, they appear as five conical islets. In the background tower the great peaks of Carriote, Morro Papagaio and Pico do Principe, 2,749 feet, 2,231 feet and 3,107 feet (837^{m}9, 680^{m}0, and 947^{m}0) high, respectively.

Numerous streams flow into the bay, through the valleys separating the lower hills.

The bay is free from off-lying dangers and the depths decrease regularly towards the shore. The only inhabitants are a few natives.

Shoals.—At about one mile east-south-eastward of Ponta do Focinho de Cão, a rocky shoal, over which there are depths of 1½ and 2 fathoms (2^{m}7 and 3^{m}7), extends about 2 cables offshore, and must be avoided by vessels wishing to take up a berth close inshore. A shoal, with depths of less than 6 fathoms (11^{m}0) over it, and with a least depth of 5 fathoms (9^{m}1), lies about three-quarters of a mile east-south-eastward of Ponta do Focinho de Cão.

Anchorage.—Good anchorage for large vessels will be found in a depth of about 12 fathoms (21^{m}9), with the northern extremity of Ponta do Focinho de Cão bearing 267°, and the hill above the charted position of the watering place bearing 187°.

Occasionally, if north-westerly winds arise, it is well to look to the moorings, but usually there is no danger.

Tornadoes blow from eastward, and may be squally from coming over the high land; if at single anchor, it may be fouled as the vessel swings from riding to the usual south-westerly breeze.

Chart 1595, plan of Ilha do Principe.

Coast.—Ponta do Focinho de Cão is a salient headland; a peak of

Chart 1595, plan of Ilha do Principe.

the same name rises within to 860 feet (262^{m}0), whence the land slopes gently to the point; about one cable westward of the point there is a group of rocks or islets named Pedras Agulhas, and a shoal, which uncovers at times, lies about 4 cables north-eastward of them.

From Ponta do Focinho de Cão the coast trends south-south-eastward for about 3¼ miles to Ponta do Grosso: nearly midway between these two points is another point, marked by a small conical hill, close off which are two rocks. About three-quarters of a mile southward of Ponta do Focinho de Cão is a small sandy bay, at the head of which is Praia Formiga; this bay does not, however, afford any shelter.

Southern side of Ilha do Principe.—Coast.—Ponta do Grosso is a rocky headland which is steep-to, and from which rises Barriga Branca, about 2,040 feet (622^{m}0) in height; this mountain, when seen from a south-easterly direction, appears as two conical peaks.

From Ponta do Grosso, the southern coast of the island, as far as Ponta do Pico Negro, forms three bays separated by rocky points; the shores of these bays are very high, rocky, and wooded, and are commanded by the high peaks of the southern range of mountains. They afford no shelter and the sea usually breaks along their shores.

Ponta Portinho is situated about one mile north-westward of Ponta do Pico Negro, and off it there is a small rocky islet round which the sea breaks heavily.

Pedras Tinhosas.—These two islets are situated about 11½ and 13 miles, respectively, south-south-westward of Ponta do Pico Negro. Tinhosa (Hermano) Grande (*Lat. 1° 21′ N., Long. 7° 18′ E.*), 180 feet (54^{m}9) high, is the southern, and larger of the two; Tinhosa Pequena (Hermano Chico), 210 feet (64^{m}0) high, lies about 2 miles north-north-westward of it. Both islets are covered with brushwood, and, in consequence of the surf, landing is difficult; they are marked by white patches of guano. When seen from an easterly or westerly direction, Tinhosa Grande presents the appearance of paps; close off the south-western side of Tinhosa Pequena is a detached rock.

Current.—The current in the vicinity of Ilha do Principe almost invariably runs in a northerly or north-north-easterly direction at a rate of from one to 1½ knots. Between Ilhéu Caroço and Ponta do Pico Negro, however, the currents are variable and in consequence caution is necessary if using this channel.

Chart 1595, plan of Ilha de São Tomé

SÃO TOMÉ.—Caution.—This island is much larger than Ilha do Principe, it also is a Portuguese possession, and is of greater commercial importance; but it is of less use as a place of call in consequence of its lack of sheltered anchorages. Calms, baffling winds, and strong currents prevail in its vicinity.

The island lies between the parallels of 0° 25′ N. and 0° 01′ S., and between the meridians of 6° 28′ E. and 6° 46′ E., and is situated about 82 miles south-south-westward of Ilha do Principe and about 128 miles west-north-westward of Cap Lopez, the nearest point on the west coast of Africa. *See* also page 167.

The waters off the western coast of the island have been but imperfectly examined, it is therefore inadvisable for vessels to close it. The limit of the bank of soundings also has not yet been determined,

Chart 1595, plan of Ilha de São Tomé.

but there is no doubt that, on the western side of the island, deep water approaches the coast more closely than on the eastern side.

The sea round the island is very clear, and the bottom can be distinctly seen in depths of 6 fathoms ($11^{m}0$). During October and November the sperm whale is to be found off the southern end of the island.

When approaching the island from westward, it is advisable, in order to take advantage of the Guinea current, to keep northward of the parallel of 1° 30′ N. until the meridian of 6° 00′ E. has been reached; and by doing so the South Equatorial current, which is found a little westward on the above parallel, and occasionally even farther northward, will be avoided. This latter current sometimes surrounds São Tomé, and northward of the island on the meridian of 6° 00′ E. has been found setting westward. Eastward of São Tomé, north-north-easterly to north-north-westerly currents generally prevail. (*See* page 33.)

São Tomé is divided up into plantations for the production and export of cocoa, coffee, and palm oil.

Roads lead from São Tomé town to different parts of the island.

Aspect.—The island of São Tomé is very mountainous, and in its central western part attains in Pico de São Tomé (*Lat. 0° 16′ N., Long. 6° 33′ E.*), an elevation of 6,640 feet ($2{,}023^{m}9$); the sides of this peak are covered with dense forest and down them flow numerous streams.

About 2 miles south-eastward, the same distance eastward, and one mile north-eastward of this central peak, are the peaks of Pico Ana de Chaves, Calvario, and a third summit, which attain the elevations of 5,367 feet ($1{,}635^{m}7$), 5,233 feet ($1{,}595^{m}0$), and 5,236 feet ($1{,}595^{m}9$), respectively. From this central mass mountain ranges radiate eastward, south-eastward, and southward. In the south-eastern range, which extends almost to the coast, are, amongst other peaks, those of Pico Maria Fernandes, Mikondo, and Pico Makurú; whilst in the southern part of the island are Pico Kabumbe, 4,603 feet ($1{,}403^{m}0$) high, Pico Cão Grande and Pico Cão Pequeno, of which both the latter have sharp summits.

The northern end of the island consists of a most fertile plain watered by numerous streams, and, from its centre at about 3 miles inland, rises an undulating chain of hills, the most northerly of which is Morro Mukinki, 896 feet ($273^{m}0$) high.

The island, when seen from north-eastward at a distance of about 60 miles, presents three very remarkable mountains, namely, Pico São Tomé, whose summit is frequently hidden by clouds, Pico Cão Grande with its needle-shaped summit, and Pico Maria Fernandes, the top of which resembles a sugar-loaf. *See* view facing page 89 and view **B** on chart 1595.

North-western side of São Tomé.—Coast.—Wharves.—Anchorages.—Ponta Diogo Vaz (*Lat. 0° 19′ N., Long. 6° 30′ E.*) is rounded and fringed with rocks on which the sea breaks.

Ponta Prainha is situated about 1½ miles north-eastward of Ponta Diogo Vaz, and about half a mile further eastward there is a wharf, used by adjacent plantations for loading cargoes.

Ponta Cadão and Ponta Figo are situated, respectively, 1½ and 2¾ miles north-eastward of Ponta Prainha (*Lat. 0° 20′ N., Long. 6° 31′ E.*).

Charts 594, 2202a, 2203, 2127.

Chart 1595, plan of Ilha de São Tomé.

Rio Provaz enters the sea at Ponta Figo, near the hamlet of Neves, where there is a cargo wharf.

Between Ponta Figo and Morro Carregado, situated about 5 miles north-eastward, the coast forms a slight indentation, in the southern end of which is Baia das Conchas, which is reported to be the best anchorage off the island, with deep water close in and good landing facilities.

Morro Carregado is high and peaked, and the point on which it stands is faced by steep rocky cliffs. About 1½ miles eastward is a low rocky point surmounted by a small conical hillock named Morro Peixe. Between these points are two small bays separated by another rocky point ; off these points are rocks, some of which dry, and the westernmost bay has a sandy beach known as Praia das Conchas.

Ponta Cruzeiro is situated about three-quarters of a mile eastward of Morro Peixe, the coast between being broken and fringed with rocks which dry.

Chart 1595, plan of Baia de Ana de Chaves.

North-eastern side of São Tomé.—Coast.—Wharf.—From Ponta Cruzeiro (*Lat. 0° 25′ N., Long. 6° 40′ E.*), the coast trends east-south-eastward for about 1¾ miles to Ponta Maria Apolinária, a rocky, projecting point surmounted by a hillock on which stand the ruins of a chapel. Near the coast, midway between these points, are the farm buildings of Fernão Dias, the yellow walls and red roofs of which are prominent ; and about 4 cables eastward is a smaller farm with two wooden houses of a greyish colour. Between the two farms is the mouth of Rio do Ouro. There is a surf on the bar at the mouth of the river, but landing can be effected a little westward of it at Fernão Dias, where there is the landing wharf of the Flores plantation, the largest plantation in the island.

From Ponta Maria Apolinária the coast trends south-eastward for about 2½ miles to a low, salient, double-headed point, the coast between consisting of sandy beaches separated by rocky projections ; Ponta Diogo Nunes is the northernmost of these two points, and Ponta Vasconcelos is the southern. Southward of Ponta Vasconcelos and between that point and Ponta Okedelrey, a prominent rocky point situated about 1¼ miles south-south-eastward, is a shallow bay at the head of which is Praia Lagarto.

Banco de Santa Ana.—Ilhéu das Cabras.—The north-eastern coast of São Tomé is fronted by an extensive shelf, over which the depths are less than 6 fathoms (11$^{\text{m}}$0) ; this shelf, about one mile outside which will be found depths of over 100 fathoms (182$^{\text{m}}$9), extends from Ponta Cruzeiro to Ponta Praião, the easternmost point of the island. Its edge, as defined by the depths of 6 fathoms (11$^{\text{m}}$0), lies about 1½ miles north-eastward of Ponta Maria Apolinária, nearly 2 miles north-eastward of Ponta Vasconcelos, 2½ miles north-eastward of Ponta Okedelrey, and about 1¾ miles in the same direction from Ponta São Sebastião, *see* below, from which last position it runs southward to Ponta Praião, *see* page 102.

On this shelf are Banco de Santa Ana, Banco do Pescador, and Banco de Ana de Chaves, *see* page 100.

Banco de Santa Ana, over which the depths are less than 3 fathoms (5$^{\text{m}}$5), extends about 3½ miles in an easterly direction from Ponta Cruzeiro, and about 4 miles in a north-north-westerly direction from

Chart 1595, plan of Baia de Ana de Chaves.

Ponta São Sebastião. About 4 cables within its north-eastern extremity is Ilhéu das Cabras, on which are two hills resembling paps, about 300 feet ($91^{m}4$) high.

Light.—A light is exhibited, at an elevation of 321 feet ($97^{m}8$), from a circular iron tower, 16 feet ($4^{m}9$) in height, situated on the north-eastern hill of Ilhéu das Cabras (*Lat. 0° 25′ N., Long. 6° 43′ E.*).

Anchorage.—The best anchorage for large vessels during the Tornado season is in Man of War roadstead about one mile north-eastward of Ponta Cruzeiro, as there the Tornadoes blow clear to seaward, whereas at the anchorages off Baia de Ana de Chaves, *see* page 101, they blow directly on to the shore. By reference to the chart and the exercise of common caution, this anchorage is easily accessible; but it can only be deemed safe when compared with those in other places on the eastern coast of the island. The best position in which to anchor is with the centre of Fernão Dias farm buildings bearing 188° and Ilhéu das Cabras lighthouse 110°, in a depth of about 7 fathoms ($12^{m}8$) sand.

Note.—Permission must be obtained from the Governor to remain at anchor in the Man of War roadstead.

Baia de Ana de Chaves.—Coast.—Between Ponta Okedelrey, on which are the ruins of the old fort of São José, and Ponta São Sebastião, situated about one mile south-eastward, is Baia de Ana de Chaves. Ponta São Sebastião is low and rocky, and has on it a fort, under which is a landing pier for small boats. This fort has brown sides with a white coping on top, and in it is a signal station, a signal mast, and the light-tower.

The head of the bay, off which depths of less than one fathom ($1^{m}8$) extend for a distance of about 3 cables, consists of a sandy beach on which stands the town of São Tomé, the capital of the island.

The bay is perfectly free from dangers, and, although open to the easterly and north-easterly winds, it offers a commodious anchorage to small vessels, which is safe except during the Tornado season.

Off-lying dangers.—Banco do Pescador extends in a north-westerly and opposite direction from a point about 1¾ miles north-eastward of Ponta Vasconcelos, and has a least depth over its central portion of 3¼ fathoms ($5^{m}9$), but it is reported that the depths between it and Banco de Santa Ana are decreasing.

Banco de Ana de Chaves, over which the least depth is about 2¾ fathoms ($5^{m}0$), lies about 2 miles north-eastward of Ponta Okedelrey, and is almost connected to Banco do Pescador.

In 1930, H.M.S. *Delphinium*, approaching the anchorage off Banco de Ana de Chaves, passed close southward of the light-buoy southward of the bank, where soundings obtained gave a less depth than that charted; it is probable, therefore, that Banco de Ana de Chaves is also extending southward.

Light. — Beacons. — Light-buoy. — Caution. — A light is exhibited, at an elevation of 42 feet ($10^{m}8$), from a circular masonry tower, 16 feet ($4^{m}9$) in height, erected in São Sebastião fort (*Lat. 0° 21′ N., Long. 6° 44′ E.*).

Two leading beacons, about three-quarters of a cable apart, stand on Ponta Okedelrey; they are in line bearing 293½°.

A light-buoy, No. 1, painted black and exhibiting a *fixed green* light, is moored at the south-eastern extremity of Banco de Ana de Chaves,

Charts 594, 2202a, 2203, 2127.

in a position about 1½ miles east-north-eastward of Ponta São Sebastião.

The position of the light-buoy is not to be depended upon.

Anchorages.—Vessels of moderate draught may anchor in a depth of about 4½ fathoms (8^m2), excellent holding ground, in a position about 6½ cables north-north-eastward of the light-tower in São Sebastião fort, but vessels of deep draught should anchor south-eastward of this position. In these outer anchorages, there is nearly always a considerable south-easterly swell, and vessels swing to the current, which is weak and irregular but frequently sets northward or north-north-eastward.

Small vessels may enter Baia de Ana de Chaves, and should anchor well inside the fort, as long south-easterly rollers often enter the bay; during the Tornado season they should anchor in the northern part of the bay. At this anchorage smooth water may generally be expected, but after Tornadoes, or when the swell sets in, the sea breaks right across the bay, but not dangerously or so as to prevent landing.

Vessels approaching the anchorage of Baia de Ana de Chaves from southward, should not anchor until the telegraph station, situated on the coast about half a mile southward of Ponta de São Sebastião bears less than 236°, in order to avoid fouling the submarine cables which are landed there, *see* page 39. The telegraph station is a white house, and care should be taken to avoid mistaking it for São Sebastião fort; near the telegraph station is the prison.

Directions.—Vessels intending to anchor off Baia de Ana de Chaves should approach, with the gateway of the cemetery, the white walls of which will be easily recognised, just open northward of São Sebastião fort, bearing 269°, until Ilhéu das Cabras lighthouse bears 329°, when any of the anchorages may be steered for, but, in view of the shoaling, soundings should be taken frequently.

Vessels from south-eastward should steer to bring the leading beacons on Ponta Okedelrey into line, bearing 293½°, and keep them so, which leads towards the anchorage north-north-eastward of São Sebastião fort.

When approaching the anchorage from southward, give Ponta Praião a berth of about one mile, and then steer for Ilhéu das Cabras and select an anchorage as convenient.

If proceeding northward from the anchorage, keep São Sebastião fort bearing more than 255° until Ilhéu de Sant' Ana, *see* page 103, bearing 184°, is just open of Ponta Praião, then steer northward, keeping the island open of the point, until the southern extremity of Ilhéu de Cabras is in line with the northern extremity of São Tomé, bearing about 278°, when the vessel will be clear of Banco do Pescador.

Currents.—Outside Baia de Ana de Chaves the currents are weak and uncertain and frequently set northward and north-north-eastward.

Town.—Port facilities.—The town of São Tomé (*Lat. 0° 21′ N., Long. 6° 44′ E.*) is well laid out and contains some good buildings of modern construction of which the principal are the Palace, the Câmara Municipal or town hall, and the Alfandega or custom-house. There is also a cathedral and several churches. The custom-house is a large building in front of which is a pier with a depth of 5 feet (1^m5) alongside, at which landing can usually be effected; when there is con-

Chart 1595, plan of Baia de Ana de Chaves.

siderable swell, however, the best landing place is that under the fort, but there are low-water rocks there which must be avoided.

A pier belonging to the Captain of the Port has a depth of one foot (0^m3) alongside at low water.

There is a hospital in which Europeans can be accommodated.

Fresh meat is plentiful, but vegetables and bread are only obtainable in small quantities.

Water is available alongside the pier at the custom house.

There is regular steamship communication with Europe.

There is a radio station, with two prominent masts, situated near the telegraph station at São Tomé, *see* page 44.

The town is in telephonic communication with the rest of the island.

Climatic table.—*See* page 70.

Coast.—From Ponta de São Sebastião, the coast is rocky, indented and fringed with rocks as far as Ponta Praião, a distance of about 3½ miles south-south-eastward. At about one mile southward of São Sebastião fort, on a slight well-wooded eminence, is the ruined fort of São Jerónymo, and about 2 miles further southward is the mouth of Rio Jorje.

Chart 1595, plan of Ilha de São Tomé.

Ponta Praião (*Lat. 0° 18′ N., Long. 6° 46′ E.*), the easternmost point of the island, is a salient feature, of moderate elevation, surrounded by rocks which dry; it stands near the south-eastern end of the plain which constitutes the northern part of the island, and southward of it the land rises steeply; at the distance of one mile west-south-westward of the point is a small conical hill, Sameiro, 469 feet (143^m0) high.

South-eastern side of São Tomé.—Coast.—Wharves.—From Ponta Praião the coast trends south-south-westward for about 4 miles to Ponta Lebre, forming between these extreme points several indentations, of which the two most important are known as Baia de Almoxarife and Ensenada de Sant' Ana; in both bays are rocks, but in the former, and northern, bay they extend far offshore; at the head of this bay is a chapel.

On Ponta Lebre is a hill 288 feet (87^m7) high; on it are several distinct clumps of trees and its southern side is cliffy; at about 1½ miles south-westward is a sandy cove, at the head of which is Praia Rei; there are some houses on the shore of this cove. There is a wharf at Praia Rei, but owing to the existence of a wreck at the entrance, and the prevailing wind and current, it is only possible for boats to make use of it.

From Praia Rei the coast trends south-westward for about 5¼ miles to Ponta dos Morcegos, and between these places it is irregular in outline with rocky heads and sandy bays, among which are Baia Luiza, Praia Morrão dos Costellos, Praia Ribiera, Praia Ghegué do Sul, Praia Mikondo, and Angra Toldo. In other places mountain streams enter the sea, or there are steep cliffs rising perpendicularly.

Ponta Agua is situated about 1½ miles south-westward of Ponta dos Morcegos, with Ponta do Ió 1½ miles further southward.

Angra de São Jão dos Angalares is contained between Ponta Agua and Ponto do Ió, and at its head is the settlement of Santa Cruz, where there is a wharf.

Chart 1595, plan of Ilha de São Tomé.

Above Ponta do Ió (*Lat. 0° 07′ N., Long. 6° 40′ E.*), which is a prominent cliffy point, Pico Makuru rises to an elevation of 1,118 feet ($340^{m}8$), round the southern side of which Rio Ió Grande flows into Praia do Ió.

In the next indentation southward is Praia Azeitona, and off Ponta Garça, the point between these last-named beaches, is a black rock above water.

At the southern end of Praia Azeitona is a point, close off which are two rocks on which the sea nearly always breaks.

Ponta Bote, situated about 2 miles south-westward of Ponta Garça, is the next prominent point on this cliffy coast, which then trends west-south-westward for about 1½ miles to Ponta Aguili, off which a reef extends about 4 cables to Ilhéu Kixiba, which is 141 feet ($43^{m}0$) high.

Baia da Praia Grande is an indentation between Ponga Aguili and Ponta São Jão, situated about 1½ miles in a south-westerly direction. The mouths of three rivers interrupt the rocky shores of this bay, and the land rises very steeply from the coast. On the western side of the bay, near one of the rivers, is the village of São Jão, but the bay affords no shelter and has not been surveyed.

From Ponta São Jão, the coast trends southward for about half a mile to Ponta Barro Preto, and thence in the same direction for about 1½ miles to Ponta Baleia, the coast between being rocky and fringed with rocks. At the summit of the hills bordering on to this part of the coast, is a small cultivated plain.

Baia de Iogoiogo is entered about one mile westward of Ponta Baleia; from the head of the bay a narrow inlet extends westward almost to the western coast of the island, and from a position near the inner end of this inlet an arm stretches southward for about one mile. The depths in this bay appear to be less than 6 fathoms ($11^{m}0$), and its western side, and the inlet, are shallow.

Between the western entrance-point of the above-mentioned bay and Ponta Lamaporco, the southern extremity of São Tomé, the coast, trending south-westward for about 1½ miles, is indented, and has several rocks close off it which dry at low water. About half a mile west-north-westward of Ponta Lamaporco is Ponta Homen da Capa.

Off-lying islets and dangers.—Ilhéu de Sant' Ana is rocky, 157 feet ($47^{m}8$) high, and its summit is covered with bushes; it lies about one mile north-eastward of Ponta Lebre. Although the coast of the islet is steep-to and the passage inshore of it is free from known dangers, it is advisable for vessels to keep well outside, in order to be clear of the squalls which prevail inshore.

The island stands on the bank of soundings, which there extends about 3 miles from the coast of São Tomé.

Balsa Grande is apparently a shoal, about half a mile in extent, with depths of less than 6 feet ($1^{m}8$) over it; it lies about one mile south-eastward of Ponta Lebre.

Sete Pedras consists, not as its name would indicate of a group of seven rocks, but of a group of more than double that number; it is about half a mile in extent and the central, largest, and highest is about 138 feet ($42^{m}1$) high. They appear, when seen from northward, as a vessel under sail, and lie, close to the edge of the bank of soundings, about 2½ miles southward of Ponta Bote. As they are steep-to, they

Charts 594, 2202a, 2203, 2127.

do not constitute a danger by day, but at night they should be approached with great caution.

Ilhéu das Rôlas.—This island (*Lat. 0° 00′ N., Long. 6° 32′ E.*), is of volcanic origin, and is the largest of the islands lying off São Tomé. Canal das Rolas, between it and the southern extremity of São Tomé, about one mile in width, is considered to be safe and clear of dangers. The island is 315 feet ($96^{m}0$) high, and covered with large trees; it has two summits, the northern of which is a conical hill. A shoal, over which the depths are less than 3 fathoms ($5^{m}5$), extends about half a mile from Ponta Santo Antonio, the north-eastern point of the island. Ponta Joana, the southern point of Ilhéu das Rôlas, and the coast adjacent to it, have been but imperfectly surveyed.

The island is cultivated and in November it is visited by turtle.

Light.—A light is exhibited, at an elevation of 348 feet ($106^{m}1$), from a red square tower, 29 feet ($8^{m}8$) in height, situated near the centre of Ilhéu das Rôlas.

Anchorage.—Landing.—Good anchorage may be had, by vessels with local knowledge, off the north-western coast of Ilhéu das Rôlas, in depths of from 4½ to 5½ fathoms ($8^{m}2$ to $10^{m}1$), with the summits bearing about 120°; in this position shelter will be found from south-easterly winds during Tornadoes, and even should she drag her anchor a vessel will drive seaward; the anchorage is not, however, recommended during southerly or south-westerly winds, which generally create a swell. In October, 1890, H.M.S. *Swallow* anchored in a depth of 5¾ fathoms ($10^{m}5$), fine sand and stones, with the summit of the island bearing 164° and the northern extremity of Sete Pedras bearing 075°; the prevailing winds during her stay were southerly and westerly, but on this occasion they only caused a slight swell.

Landing is impracticable at the southern end of the island, but a good landing, free from surf, can be made abreast the houses in the eastern part of the north-western side of the island. This landing place is sheltered by a reef that runs out from the western end of the houses for about half a cable, and curves slightly eastward at its outer extremity. The sea generally breaks over this reef, and great care should be taken by boats to avoid it; under its shelter a safe and dry landing can be effected.

South-western side of São Tomé.—Coast.—Anchorage.—From Ponta Diogo Vaz, the coast trends south-south-westward for about 3 miles to Ponta Alema, close north-eastward of which is Praia Santa Caterina where there is a wharf. From Ponta Alema the coast runs south-south-westward about 2 miles further to Ponta Furada, the westernmost point of the island, so called because of an opening in it caused by the action of the sea.

Ilhéu Côco (*Lat. 0° 12′ N., Long. 6° 28′ E.*) lies close to the coast about 2½ miles southward of Ponta Furada, it is high at its eastern end and wedge-shaped, falling westward in a straight line. About 8 cables south-south-eastward of Ilhéu Côco is a point surmounted by a hill known as Morro Joana de Souza, 1,112 feet ($339^{m}0$) high, one-quarter of a mile off which are two islets known as Ilhéus Joana de Souza.

From Morro Joana de Souza a rocky and cliffy coast extends southward, with a slight indentation, for about 3½ miles to Ilhéu Gabado, which lies about one-quarter of a mile offshore, and is the largest of a

Chart 1595, plan of Ilha de São Tomé.

group of five islets, of which the others lie between Ilhéu Gabado and the coast half a mile north-north-eastward of it. The south-western and largest of the others is Ilhéu São Miguel, north-eastward of it is Ilhéu Formozo, and northward of the latter is Balsa Voador : the two first are covered with bushes, and the last lies abreast a small sandy cove at the head of which are some rocks. The smallest is unnamed.

Baia de Pilar is entered between Ponta Azeitona, which is sharp, wedge-shaped, and fringed with rocks, and a point 1½ miles northward of it ; the shores of the bay are mostly rocky, and at its head are a small sandy beach and the mouth of a stream. The bay is well sheltered from easterly and south-easterly winds, but it has been only imperfectly surveyed.

Ilhéu Macoco, or dos Cocos, is a large rock of moderate height, and is situated at the southern end of a bight which is entered between the coast abreast this rock and Ponta Azeitona about 1¾ miles north-westward. This locality has not been properly surveyed.

From a point close south-eastward of Ilhéu Macoco, the coast trends southward for about 2½ miles to Ponta Zále (*Lat. 0° 03′ N., Long. 6° 31′ E.*), which is high and cliffy with an islet close off it.

This stretch is composed almost entirely of abrupt rocky cliffs, though there are a few beaches, of which Praia do Calaboyo, situated about one mile southward of Ilhéu Macoco, may be mentioned. There is also a small cove, named Vá Inhá, close northward of Ponta Zále.

Baia Lamaporco is entered between Ponta Zále and Ponta Homen da Capa ; it is a slight indentation, about 1¼ miles wide, with three beaches. This bay affords good anchorage, to vessels with local knowledge, during south-easterly winds, but it is unsafe with winds from the usual quarter.

The best position in which to anchor is abreast the village, which is not indicated on the chart, in a depth of about 6½ fathoms ($11^{m}9$), with the northern cone of Ilhéu das Rôlas open southward of Ponta Homen da Capa.

Off-lying danger.—Balsa da Flamengo is charted about one mile westward of Ponta Zále, but its existence is doubtful.

Chart 1595, plan of Isla de Annobon.

ANNOBON.—This Spanish possession is the smallest and south-westernmost of the chain of islands in the Bight of Biafra ; it is situated about 105 miles south-south-westward of São Tomé, and about 190 miles west-south-westward of Cap Lopez, the nearest point on the west coast of Africa. *See* page 167.

The island is mountainous and rises in varied and picturesque forms to a considerable elevation in its central part, forming three peaks, of which the most northern, Pico do Fogo, is about 1,493 feet ($455^{m}1$) high. This mountain is in form a truncated cone, the sides of which are thickly wooded to within a short distance of its summit, close to the foot of this peak, on its south-western side, is a small fresh water lake, filling what appears to be the crater of an extinct volcano. Southward of the lake, Pico del Centro rises to an elevation of about 2,070 feet ($630^{m}9$), and nearly one mile further south-eastward is Pico Surcado, about 2,149 feet ($655^{m}0$) high.

The central parts of the island are covered with orange and lime trees, and near its shores are groves of coconut palms and plantain trees.

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Chart 1595, plan of Isla de Annobon.

Caution.—It should be borne in mind when navigating in the vicinity of Isla de Annobon that the chart is based on a very old survey.

In particular the eastern and south-eastern coasts have not been accurately surveyed, and they should be approached with great caution.

Northern side of Annobon.—Coast.—Light.—Punta Norte-Oeste, the north-western extremity of Annobon, is formed of steep rocky cliffs which extend north-eastward for about 3½ cables to Punta de la Isleta, a low point close off which is Islote Yebatelu, a rocky islet, and close north-eastward of which are some above-water rocks near the coast. Beyond these rocks is a sandy shore, which extends to Punta del Palmar (*Lat. 1° 24′ S., Long. 5° 37′ E.*), the northernmost point of the island.

Between Punta del Palmar and Punta del Paso, situated about 1¼ miles south-eastward, the coast is fronted by a sandbank which extends in some places for about 3 cables offshore, and over which the depths are less than 3 fathoms (5^{m}5); in addition, a detached 3-fathom (5^{m}5) patch is charted about 2½ cables northward of Punta del Palmar.

A light is exhibited, at an elevation of 145 feet (44^{m}2), from a tower, 16 feet (4^{m}9) in height, situated near Punta del Palmar and 1¼ cables north-eastward of the Mission San Antonio church.

Punta Piramide, which is situated about 2 cables south-eastward of Punta del Palmar, is low, sandy, and close off it are a large number of rocks, of which the highest and most conspicuous is Islote la Piramide, or Yecuyi; from this rock, which is high, conical, and bare, a reef extends in a north-westerly direction, forming a natural breakwater about a cable in length. When there is no surf, small craft can use the passage between the rock and the shore.

On the sandy shore within this rock, stands the village of San Antonio, the largest in the island, but it is small and unhealthy.

The best landing-place, which however is not free from surf, is on the eastern side of a reef eastward of Islote la Piramide; landing is best effected in a native canoe, though it is quite practicable in a surf boat, but, as the shore here is rocky, it should not be attempted without local knowledge. The surf is said to be heaviest between March and December.

Punta Pedrinha, which is situated about 3½ cables south-eastward of Islote la Piramide, as well as the coast on either side of it, is cliffy and fronted by rocks.

Punta Yoyo, which is situated about 4 cables south-eastward of Punta Pedrinha, is a rounded point, and it also is cliffy, of moderate height, and fronted by rocks; close southward of the point is the mouth of a stream, off which there are usually breakers.

Punta del Paso is a rocky point, rising almost perpendicularly to a bluff, and on its seaward face are needle-shaped rocks of basaltic formation.

Off-lying islets.—Islote Tortuga, also known as Yegani or Piedra Grande, situated about 8 cables north-eastward of Punta del Paso, is about 164 feet (50^{m}0) high and steep-to; there are, however, two rocks off its north-eastern extremity.

Islote del Paso, or Piedra Chica (*Lat. 1° 25′ S., Long. 5° 38′ E.*), lies

Charts 594, 2202a, 2203, 2127.

Chart 1595, plan of Isla de Annobon.

midway between Islote Tortuga and Punta del Paso, and is small and flat. The passage between Islote Tortuga and the islet is safe, the least depth being 5¾ fathoms ($10^{m}5$).

Anchorages.—Current.—The land in the vicinity of San Antonio is difficult to identify when approaching from seaward, as the mountains are nearly always covered by clouds, and the village is not easily distinguished except when close to it. Islote la Piramide is however a useful mark when approaching.

The anchorages between Punta Palmar and Punta del Paso should be approached with caution, as the locality has been but imperfectly surveyed, and patches of coral evidently exist. The best anchorage to be found off Annobon is in depths of from 12 to 15 fathoms ($21^{m}9$ to $27^{m}4$), sand, about 6½ cables north-eastward of the village of San Antonio, with Isla Tortuga bearing about 120°, and Islote Yebatelu about 235°. The position is in smooth water and the holding ground is good.

Another anchorage is about half a mile north-north-eastward of the mouth of the fresh water stream mentioned above, in from 6 to 8 fathoms ($11^{m}0$ to $14^{m}6$), with Islote Tortuga bearing 080° and Islote del Paso 146°.

The land affords shelter against the prevailing southerly and south-westerly winds, thus enabling vessels to ride in smooth sea and perfect safety.

Only during the period from March to September, when Tornadoes recur and strong easterly winds may blow directly into the anchorage, is any danger to be apprehended; but, as the gloominess of the sky and the heavy thunder and lightning, by which they are preceded, always give timely warning, vessels not having good ground tackle may get under way and stand off until the storm, usually of short duration, has passed over.

At Annobon, from January to April, the current generally runs north-westward but is deflected eastward off the southern coast of the island. From then to June it sets north-eastward from 10 to 40 miles a day till August, when it sets round the island north-eastward. In October it appears to encircle the island, running eastward off the western and northern coasts and southward and westward off the eastern and southern coasts. In November and during the remainder of the year it runs steadily north-north-westward at the rate of from 10 to 30 miles a day.

In December it has been found to vary in strength from one half to 1¾ knots, and H.M.S. *Milford*, in April, 1933, found the current setting in the same direction at about 1½ knots.

The tidal streams are always very weak.

Eastern and southern sides of Annobon.—Coast.—From Punta del Paso (*Lat. 1° 25′ S., Long. 5° 38′ E.*) the coast trends south-south-eastward for three-quarters of a mile to Punta Budjiguelé; Bahia de San Pedro, at the head of which is the village of San Pedro, is contained between this point and Punta Jasgañia, 3 cables farther south-south-eastward.

Punta de San Juan and Punta Lokotomfen are situated 5 and 11 cables, respectively, southward of Punta Jasgañia.

Punta Dologany, about a quarter of a mile southward of Punta Lokotomfen, is a rocky and moderately high point from which the

Charts 594, 2202a, 2203, 2127.

Chart 1595, plan of Isla de Annobon.

land rises to the summit of Pico Surcado, 2,149 feet (655^{m}0) high, three-quarters of a mile north-westward.

From Punta Dologany, the coast trends south-westward, with two bays intervening, to Punta Mofina, a low sharp point behind which the land also rises to Pico Surcado.

In the northern of these two bays is the village of San Juan.

From Punta Mofina, the coast, which here is dominated by high land, trends westwards to Punta de San Antonio, which is salient and forms the south-western extremity of the island. This point is rocky and rounded in form, with considerable off-lying rocks, on which the sea generally breaks, projecting about a quarter of a mile off it.

Western side of Annobon.—Coast.—Punta Alvaro, on the western side of Annobon, is situated about three-quarters of a mile north-westward of Punta de San Antonio, and between the two there is a bay. Punta Alvaro is surmounted by a moderately high peak, on the summit of which there are numerous pinnacles.

From Punta Alvaro, the coast, generally cliffy, recedes north-eastward for about 3 cables to Punta Consuix, between which point and Punta Guxi half a mile north-north-eastward is Bahia de Santa Cruz. The village of Santa Cruz is situated near the shore at the head of this bay.

From Punta Guxi the cliffy coast trends north-north-westward for about 8½ cables to Punta Jatupa, between which point and Punta Penkadu, 1½ cables east-south-eastward lies a small bay.

Punta Jiscoy, the westernmost point of the island, is situated about half a mile north-north-westward of Punta Jatupa, and about 2 cables south-south-westward of Punta Norte-Oeste (page 106).

Isleta Yemama, a small detached islet, is situated close inshore about 2 cables south-eastward of Punta Jiscoy.

The sea breaks heavily along the western coast between Santa Cruz and Punta Jatupa.

The western side of the island, though safe and steep-to, should be avoided, as it affords no shelter for shipping.

Islets lying off the southern end of Annobon.—Islote Adams, situated about 3½ cables southward of Punta Mofina (*Lat. 1° 28′ S., Long. 5° 38′ E.*), is small, rocky, of moderate height, and presents two summits when seen on an easterly or westerly bearing.

Between about three-quarters of a mile and one mile southward of Punta de San Antonio, are three high conical islets or rocks, which may be seen at a distance of about 18 miles. The locality has not been surveyed, but it is presumed that, like the coasts of Annobon, the islets are steep-to.

The southernmost is called Fernando Póo, the easternmost Escobar, and the northernmost Santarem, after the three navigators who discovered the islands in the Bight of Biafra.

Charts 594, 2202a, 2203, 2127.

CHAPTER III

RIO DEL REY TO CAP ESTEIRAS

CLIMATE AND WEATHER.—*See* page 53.

Charts 1860, 1357, 594.

BIGHT OF BIAFRA.—General remarks.—This extensive indentation on the western side of Equatorial Africa lies between Cape Formoso (*Lat. 4° 16′ N., Long. 6° 05′ E.*), and Cap Lopez (*Lat. 0° 38′ S., Long. 8° 42′ E.*).

Numerous rivers, amongst which are the Calabar, Cameroun, and Gabon, drain into the bight.

For the description of Calabar river, together with that of the coast westward of it, *see* Africa Pilot, Volume I.

At the head of the bight, and within a short distance of the coast, the massive Cameroons mountains rise abruptly from the sea. The highest peak, Mongo-ma-Loba, is a volcano which was active on its western slope in 1922; except in the vicinity of its rounded summit, which attains an elevation of 13,350 feet (4,069^{m}1), its sides are clothed with trees and verdure of luxuriant growth. About 9 miles south-south-westward of this peak and about 3 miles inland, another peak, Mongo-ma-Etindeh, ascends from the south-western slopes of the mountains to an elevation of 5,728 feet (1,745^{m}9). Although numerous hills rise from the slopes of this mountain range, they appear so inconsiderable when compared with the central peak, as scarcely to break the uniformity of its gradual incline. *See* views facing page 112.

The more distant range of the Rumpi mountains, the base of which lies about 30 miles northward of Mongo-ma-Loba, tower aloft in huge peaks and rugged masses, whose summits attain the elevation of 4,000 to 6,000 feet (1,219^{m}2 to 1,828^{m}8). The highest of these mountains is situated about 44 miles north-north-eastward of Mongo-ma-Loba, and the space which intervenes between the bases of these ranges consists of a plain, from the surface of which several conical hills rise abruptly.

Boundary mountain, situated about 70 miles north-north-westward of Mongo-ma-Loba, is 3,547 feet (1,081^{m}1) high, and is surrounded by other peaks, of which Mount Hewitt appears to be the southernmost; these mountains are visible from seaward, and are extinct volcanoes.

Chart 1860.

BAKASI PENINSULA TO CAPE NACHTIGAL.—Coast.—Bakasi peninsula separates the estuary of Calabar river from that of Rio del Rey.

Charts 594, 2202a, 2203, 2127.

Chart 1860.

Sandy point (*Lat. 4° 34′ N., Long. 8° 29′ E.*) is situated on the western side of the peninsula about 6 miles south-south-westward of Bakasi point, the south-eastern entrance point of the Akwayafe river, *see* page 1.

Akwabana creek enters the estuary of Calabar river about 2 miles north-eastward of Sandy point, and is described below. East point, the south-western extremity of Bakasi peninsula, is situated about 3 miles southward of Sandy point.

Bakasi gap is a conspicuous inlet situated about 2½ miles east-south-eastward of East point; Cape Bakasi lies about 8 miles further eastward.

West point, the eastern extremity of the peninsula, is situated on the western side of the entrance to Rio del Rey.

Bakasi bank, over which the depths are less than 3 fathoms ($5^{m}5$), extends about 7 or 8 miles southward from the southern coast of the peninsula, but the central part of the bank has not been surveyed.

Rio del Rey.—Beacons.—Pilot.—This estuary is an extensive, open, shallow bay, the entrance to which is about 13 miles wide, and into which flow the Fiari, the Ofa or Ndian, the Meta, Andonkat, and Meme rivers. The shore of the bay on the eastern side slopes from the lofty Cameroons mountains, and that on the western side is formed by the south-eastern extremity of the Bakasi peninsula. The shores are well populated, the villages are built on the shores of the bay and are visible from seaward.

In January, 1940, vessels having a draught of not more than 21½ feet ($6^{m}5$) could cross the bar at high water spring tides.

There are beacons on Cape Bakasi and on West point, and there is also a beacon at the south-western extremity of Erong peninsula on the eastern side of Fiari river.

Chart 3423, plan of Akwayafe river.

Fiari river is the western of the five rivers which flow into the bay and is about 2 or 3 miles wide; it is connected by several creeks to Akwayafe river and can be ascended by vessels of moderate draught. The depth over the bar is about 2½ fathoms ($4^{m}6$), but, as changes constantly take place, this depth cannot be relied upon and a pilot is, therefore, necessary. On the western bank of the river, about 10 miles above the entrance, is Apes point (*Lat. 4° 38′ N., Long. 8° 40′ E.*), opposite which is the mouth of the Ofa or Ndian river, which in turn is connected to the Meta and Andonkat rivers.

Rio del Rey, where there is no European settlement, is situated in a mangrove swamp on the western bank of Fiari river, about 7 miles above Apes point. There are two channels leading westward from Rio del Rey to the estuary of Calabar river; one of which, called the Southern creek, comprises the Atino, Inyunto, Avosse, and Akwabana creeks and is used by local steam vessels. Goods from Rio del Rey are sent to Calabar for shipment through this channel instead of by the seaward route round Bakasi peninsula, thus saving a distance of 43 miles between the two places.

Chart 1860.

Meta river enters the estuary between Erong peninsula, on the eastern side of Fiari river, and Fiari island; it is apparently navigable for a distance of about 15 miles.

Andonkat river is navigable for about 12 miles above its mouth,

Chart 1860.

which is situated between Fiari island and the Pelican peninsula; but its entrance is obstructed by Soden island and by sandbanks over which there is a depth of only 7 feet ($2^{m}1$).

Meme river, on the eastern side of Pelican peninsula, is navigable as far as Duben falls, about 31 miles from its entrance. The river, which, in 1938, was cleared of snags for a distance of 26 miles, is connected to Andonkat river by a creek and by Massake river, both of which run through Pelican peninsula.

Bananas and other produce are shipped into ocean-going vessels, which anchor off West point.

Coast.—At the entrance to Meme river, about 11 miles eastward of West point, the general direction of the coast changes abruptly from east to south; and southward the coast consists principally of low cliffs in which are many caves; two of the largest of these are connected by a gallery, the side of which is pierced at equal intervals, so that, from a distance, this portion of the cliffs resembles a fort excavated in the rock.

Kolle point is situated about 2 miles southward of the mouth of the Meme river, and the village of Bamuso about 1½ miles further in the same direction.

Betika (Bombo Betika) point (*Lat. 4° 17′ N., Long. 8° 55′ E.*) which is situated about 10 miles southward of Bamuso village, forms the termination of a ridge of hills.

Madale rocks, of which the highest is 4 feet ($1^{m}2$) high, extend 1½ miles in a south-westerly direction from Madale de Coto point, a point situated 2 miles south-south-eastward of Betika point. The westernmost of Madale rocks are covered by the *red* sector of Debunja point light.

The whole of this portion of the coast is fronted by the sandbank extending across the estuary of the Rio del Rey to the Bakasi peninsula.

Bibundi bay.—This bay is entered between Madale de Coto point and Debunja point situated about 10 miles southward. Bibundi river enters the bay about 4 miles south-eastward of Madale de Coto point; northward of the river, the shore of the bay is composed of black mud on which are mangrove bushes; southward it is rocky.

The entrance to Bibundi river is narrow and difficult to make out from seaward; it is situated between a sandy spit on the northern side and a steep, rocky bank on the southern side. The river is always accessible to small boats, but a vessel drawing 5 feet ($1^{m}5$) or more, would have to wait until half-flood tide. Just within the entrance the river forms a small harbour, of about one acre in extent.

Bibundi town, near which are some cocoa plantations, is situated about one cable from the beach, and is concealed by trees; it is the trading centre of the country westward of the Cameroons mountains.

Anchorage.—**Directions.**—There is good anchorage off the town for vessels with local knowledge in a depth of about 6 fathoms ($11^{m}0$), mud, at a distance of about 7 cables from the coast. Anchorage may also be found in the southern part of the bay, in a depth of about 9¾ fathoms ($17^{m}9$), sand and mud, with Debunja point bearing about 189° and Nyonye village about 080°.

When entering Bibundi bay from southward, vessels should not approach the coast nearer than from one mile to 1½ miles, nor should they get into depths of less than 5½ fathoms ($10^{m}1$).

Charts 1357, 594, 2202a, 2203, 2127.

Chart 1860.

Debunja point.—Light.—Debunja point is a bold headland terminating in cliffs of red limestone, about 50 feet ($15^{m}2$) high.

A light is exhibited, at an elevation of 262 feet ($79^{m}9$), from a white circular tower, 33 feet ($10^{m}1$) in height, with a dwelling attached, situated on Debunja point (*Lat. 4° 06′ N., Long. 8° 59′ E.*), *see* view facing page 113.

Coast.—Beacons.—Izongo point, off which a drying reef extends about half a cable, with, probably, sunken rocks beyond that distance, is situated about 3 miles south-eastward of Debunja point; when seen either from north-westward or south-eastward, the point appears as a well-defined bluff.

There is a small pier at Izongo, with a depth alongside of 6 feet ($1^{m}8$) at low water, situated in a small sandy bay with some sheds at its head. There are some rocks on the eastern side of the bay, beyond which steamboats should not go, though lighters and surf boats can go right in and discharge their cargo.

Leading marks, consisting of two triangular beacons, 6 feet ($1^{m}8$) high, in line bearing 036°, indicate the best channel in to the pier.

From this bay, the coast extends in a south-easterly direction for about 6½ miles to a point off which is Batoki rock; along this part of the coast, upon which the sea usually breaks heavily, are the mouths of numerous small streams.

Anchorages.—Anchorage may be obtained by vessels with local knowledge, off Bakingele village, situated about 2½ miles east-south-eastward of Izongo point, at a distance of about half a mile offshore, in depths of about 9 fathoms ($16^{m}5$), uneven rock, with Izongo point bearing about 300°.

Chart 1456.

Batoki rock (*Lat. 4° 01′ N., Long. 9° 06′ E.*) is 50 feet ($15^{m}2$) high, and is connected to the coast by a reef of rocks. Anchorage can be obtained, by vessels with local knowledge, about 3 cables off the rock, in a depth of about 10 fathoms ($18^{m}3$), mud, with the rock bearing 050°, and Limboh point, situated 1½ miles east-south-eastward, bearing 100°.

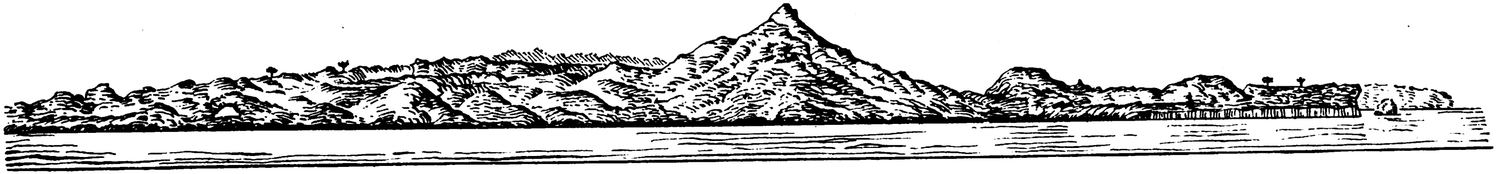
Batoki village cannot be seen from seaward. The landing there is bad, but the best place is about a quarter of a cable westward of Batoki rock.

Dangers.—Habicht rock, over which there are depths of from 3 to 6 feet ($0^{m}9$ to $1^{m}8$), is a shoal lying about 7 cables south-eastward of Batoki rock and about 4 cables offshore. Foul ground extends from the coast to the rock.

A shoal, having depths of less than 5 fathoms ($9^{m}1$), extends about 3 cables from Limboh point, half a mile westward of which there is a small bay, which is quite shoal.

Coast.—Nyeme point is situated about 1½ miles eastward of Limboh point, the intervening coast forming a bight on the western side of which is the roadstead of Mukondange. The village of Bobende is situated at the head of the bight, and Nyonye factories on its eastern side, inside Nyeme point. Landing can be effected at Mukondange (Makondanye), where there is a small stone wharf with a crane. In the middle of the bight, a shoal spit extends offshore for 7 cables in a southerly direction, and close off its southern extremity, nearly

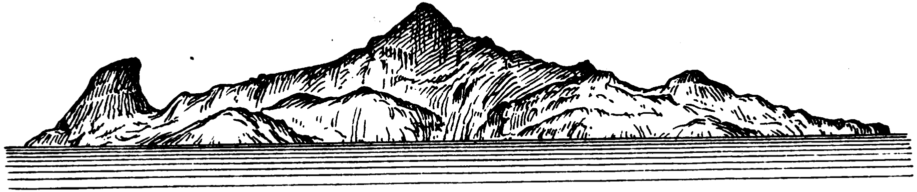
To face page 112.



Mongo-ma-Loba, bearing about 021°.

Cameroons mountains from south-westward.

(*Original dated* 1939.)

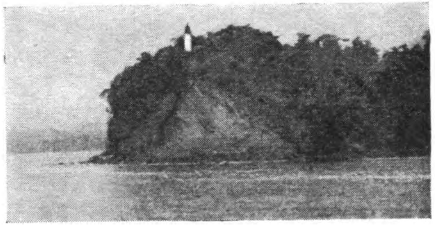


Mongo-ma-Etindeh. *Mongo-ma-Loba, bearing* 338°.

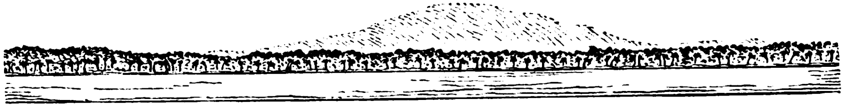
Cameroons mountains from south-eastward.

(*Original dated* 1870.)

To face page 113.

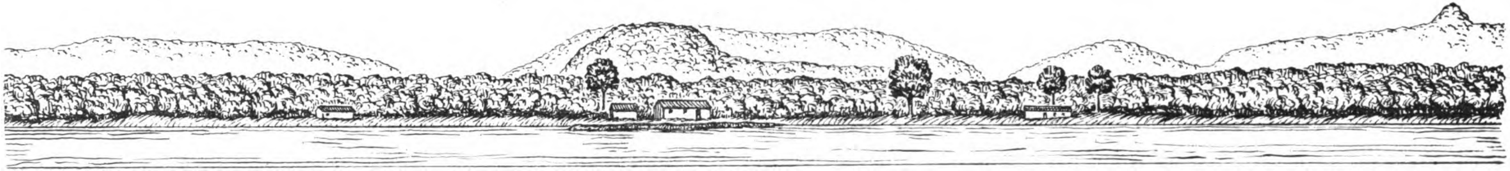


Debunja point lighthouse.
(*Original dated* 1933.)



Mont Eléphant, bearing 075°,
distant about 12 *miles.*

Mont Eléphant from west-south-westward.
(*Original dated* 1922.)



Daumas factory.

Military post, bearing 110°,
distant 2 *miles.*

Sajoux factory.

Bata from west-north-westward.
(*Original dated* 1892.)

Chart 1456.

midway between Limboh and Nyeme points, there is a rock, over which is a depth of 6 feet (1^m8).

Mukondange roadstead should only be approached by vessels having local knowledge.

Chart 1455.

AMBAS BAY.—This bay is entered between Nyeme point and Cape Nachtigal, situated about 5 miles south-eastward. In the bay are Ambas, Mondoleh and Pirate islands. From Nyeme point, the northern shore of the bay trends eastward for about 1¼ miles and is fairly steep-to ; eastward of this is a small bight which is foul, at the western end of which is the village of Bengune where there is a small stone pier. Pirate islands are situated about 1¾ miles eastward of Nyeme point (*Lat. 4° 00′ N., Long. 9° 09′ E.*). The eastern shore of the bay, overlooked by four hills, is bold from Cape Nachtigal, the southern extremity of Monkey peninsula, to Morton point, about 2¾ miles northward of it. Morton bay, on the shore of which is the town of Victoria, is situated at the head of Ambas bay.

Between May and September the swell, which is the chief obstacle to the development of Ambas bay as a harbour, rises very quickly, and, causing a heavy surf, makes landing very dangerous, and, at times, impossible. This swell consists of two main parts, one setting fairly constantly into the bay from westward, between Ambas and Pirate islands, and varying in height according to the existing conditions ; and the other, when the wind strengthens or after a Tornado, entering from southward and south-westward, between Mondoleh and Ambas islands. This latter part runs straight into Morton bay, turning and carrying with it the usual swell from westward, and finally breaking, with great violence, on the rocks in the bay ; it appears to have a definite westerly limit, extending from Ambas island to the north-western corner of Morton bay.

Having got up, the swell takes a considerable time to settle down, especially if fresh winds spring up, or Tornadoes occur during the periods of full and change of the moon. Between Mondoleh island and the mainland, a short choppy sea, which is dangerous to boats, gets up, especially on the falling tide.

Cape Nachtigal.—**Light.**—A light is exhibited, at an elevation of 148 feet (45^m1), from a white masonry tower, 46 feet (14^m0) in height, situated close to the extremity of Cape Nachtigal (*Lat. 3° 57′ N., Long. 9° 13′ E.*), the most southerly point of Monkey peninsula.

Islands and dangers in Ambas bay.—Ambas island, 166 feet (50^m6) high, is the outer and westernmost island in Ambas bay. It is a narrow ridge of rock, elevated at its southern extremity, and tapering to a point at its northern end. Excepting the northern end, which is bare rock, the island is well covered with trees, brushwood, and grass ; landing, which is effected near the northern extremity of the island, is difficult on account of rocks and the incessant swell, and is only possible in calm weather.

Mondoleh island, the largest in the bay, is situated between Ambas island and the eastern shore ; it is 331 feet (100^m9) high to the tops of the trees, and is composed of volcanic rock ; its steep sides are heavily wooded, but its summit has a level surface of rich soil. Halfway up the north-western side of the island there are the ruins of

Chart 1455.

a house; there are a few springs on the island, which are said to be always running. The landing place, at the northern end of the island though bad, is better than that at Ambas island.

Pirate islands, so called from the supposed disposition of the natives, are a group of islands and rocks, situated on a shoal spit which extends about three-quarters of a mile in a southerly direction from a point on the northern shore of the bay, situated 1¾ miles eastward of Nyeme point.

Bobia island, 110 feet (33^m5) high, is the northernmost and largest of the group, and is situated about 1½ miles northward of Ambas island; it is more barren than the other islands in the bay, and, in all probability, was formerly joined to the adjacent perpendicular cliff on the mainland, as the geological structure is similar, and between them there is only a narrow, shallow channel. That the process of erosion continues, is evinced by the enormous fragments of recently fallen rock which lie at the northern extremity of the island.

Although Bobia island is much smaller than the other two large islands in the bay, it is densely populated, almost every available spot on its rugged surface being occupied by a hut. It is perpendicular on all sides, and the only access to its summit is by a narrow path, the ascent of which is dangerous owing to the crumbling nature of the rock. The islanders are the principal fishermen of the bay, which, in fine weather, they cover with their light canoes.

On the spit, on which the Pirate islands are situated, are many rocks, the seven principal ones of which are above water, and range from 9 to 108 feet (2^m7 to 32^m9) in height. A depth of 8 fathoms (14^m6) will be found close southward of the southern extremity of the spit. The passages between these rocks should not be attempted.

Lucke islet (*Lat. 4° 00′ N., Long. 9° 11′ E.*), 64 feet (19^m5) high, is situated about half a mile eastward of Bobia island, and about a quarter of a mile offshore; it is covered with trees.

Morton bay.—This bay lies at the head of Ambas bay and is contained between a point, situated about a quarter of a mile northward of Lucke islet, upon which there is a conspicuous white church with a spire on its western end, and Morton point.

The whole of the foreshore between these two points is fringed with rocks, and depths of less than 3 fathoms (5^m5) extend as much as half a mile offshore in places.

The village of Bota is situated on the north-western shore of the bay, and Victoria on its north-eastern shore. The bay is open to the prevailing wind and swell, the latter causing a heavy surf at times, with a backwash on to the landing steps on the inshore side of the mole at Bota. It is reported that there is broken water in the inner boat harbour at Victoria when strong winds prevail.

Bota is the terminus of a light railway which runs to Ekona, about 18 miles inland, and to Soppo which is the nearest station for Buea.

There is a small mole at Bota, with a depth alongside of 6½ feet (2^m0) at low water, on to which the railway runs and on which there is a crane. The mole almost dries on its inshore side, but lighters can get alongside at half-tide. If landing is impossible at Bota, it can nearly always be effected at Victoria. Coffee hill rises to an elevation of 420 feet (128^m0) about 3 cables east-north-eastward of Bota pier.

Charts 1456, 1860, 1357, 594, 2202a, 2203, 2127.

Chart 1455.

Beacons.—Lights.—Leading marks.—A white beacon is situated about 3½ cables north-north-westward of the conspicuous white church at Bota.

Two leading beacons exist near the foreshore about half a mile westward of Bota. The front one is a conspicuous white triangular beacon, 14 feet (4^{m}3) in height, the summit of which is at an elevation of 24 feet (7^{m}3), situated about 2½ cables westward of the conspicuous white church at Bota. A rear beacon is situated 009°, distant 650 feet (198^{m}1) from the front beacon. These beacons in line, bearing 009°, lead between Ambas and Mondoleh islands.

Lights are occasionally exhibited from these two leading beacons.

The conspicuous church bearing 019°, open westward of the western extremity of Lucke islet, also leads into Ambas bay, between Ambas and Mondoleh islands.

Two white beacons, situated about 4 cables eastward of Bota pier, in line bearing 032°, also lead between Ambas and Mondoleh islands, into Morton bay. Lights are occasionally exhibited from these beacons, but the lights are unreliable.

Two lights, vertically disposed, are exhibited from a flagstaff on the head of the pier at Bota (*Lat. 4° 01′ N., Long. 9° 12′ E.*).

Anchorage.—Vessels should anchor northward of the pecked line, shown on chart 1455 between Morton point and Pirate islands, in the berth indicated by the distant signals, which are exhibited on the flagstaff at the head of the disused Government pier at Victoria as follows :—

Berth A, 3 cables 225° from Bota church ; a cone painted in black and white horizontal bands, point upwards, shown at the masthead. Little swell is felt in this position.

Berth B, 5$\frac{6}{10}$ cables 210½° from Bota church ; a cone painted in black and white horizontal bands, point downwards, shown at the starboard yardarm. This is the best berth for vessels of deep draught, as less swell is felt in this position than in berths C and D.

Berth C, 4½ cables 185½° from Bota church ; " C " flag over the first substitute. This berth will only be used in special circumstances by direction of the Harbour-master.

Berth D, 6$\frac{1}{10}$ cables 126° from Bota church ; black and white horizontally striped globe, shown at the port yardarm. This berth is a fine weather anchorage, and, should two or more vessels enter and desire to anchor in this vicinity, the second and third vessels should anchor as close to berth D as practicable, but not northward of it.

During the Tornado season the best anchorage is north-eastward of Mondoleh island.

The holding ground is excellent in all parts of Ambas bay, in depths of from 6 to 7 fathoms (11^{m}0 to 12^{m}8) ; although the anchorage is on a lee shore, it is said that the wind seldom blows home so as to endanger vessels, and that it is a secure anchorage all the year round.

Between May and September, it is seldom, if ever, possible for two vessels to lie alongside one another to work cargo, or for coaling, etc., and even lighterage work is extremely difficult and dangerous at times, owing to the heavy swell.

Tidal streams.—The flood stream sets southward, and the ebb northward, in and out of Ambas bay, between Ambas island and the

Chart 1455.

Pirate islands; both streams appear to be of equal duration, and at times are strong in the vicinity of Ambas and Mondoleh islands.

Victoria. — Lights. — Beacons. — Buoys. — This settlement (*Lat. 4° 00′ N., Long. 9° 12′ E.*) is the seaport of Buea, the seat of the Government; *see* page 2.

Although lying at the foot of the Cameroons mountains and surrounded by bush-covered hills, Victoria is one of the healthiest places on the coast of West Africa; the nights are always cool, owing to the breeze coming down from the mountains, and in the daytime the sea breeze blows straight into Morton bay.

The District Officer's house stands in the botanic gardens. Limbe river flows down the mountain side into Morton bay between the District Officer's house and Victoria.

About half a mile south-eastward of the District Officer's house, there is an iron pile pier which, in 1946, was in a state of disrepair and no longer in use.

A light is occasionally exhibited from a flagstaff 13 feet ($4^{m}0$) high, situated at the head of the disused pier, but is unreliable.

Between the pier and Morton point is a stretch of sandy beach, where boats can be hauled up for repairs, but if left there during a heavy swell, difficulty may be experienced in refloating them, owing to the sand banking up round them.

Off this beach, inside Morton point, is the inner harbour, where lighters and small craft, drawing up to 6 feet ($1^{m}8$), can lie safely at anchor in any weather provided the ground tackle is good. The best anchorage is about three-quarters of a cable southward of the pier in a depth of about one fathom ($1^{m}8$). This anchorage, as well as the pier, is protected from the full force of the swell by a large patch of rocky and foul ground lying south-westward of the pier head.

Two white beacons, the front triangular and the rear diamond-shaped, from each of which a light is occasionally exhibited, are erected on the shore about 1½ cables southward of Victoria pier. These beacons in line, bearing 080°, lead through the boat channel in the approach to the pier.

After Tornadoes, great care must be taken in navigating this channel as the sea sometimes breaks right across it at long intervals and without warning.

Two small buoys are moored south-westward of the head of Victoria pier to mark the southern extremity of the foul ground protecting the inner harbour; boats should pass southward of these buoys.

Port facilities.—A limited supply of meat and bread of poor quality is available. A limited quantity of vegetables and fruit can be obtained at 24 hours' notice. Fresh water can be obtained from a hydrant on the pier by vessels drawing up to 4 feet ($1^{m}2$).

There are two slipways, each capable of lifting a vessel of about 60 tons, whose length does not exceed 79 feet ($24^{m}1$). Minor repair facilities exist for small craft only.

In 1948, there were 4 self-propelled and 4 dumb lighters.

There is a regular steamer service with Europe and also a local service to Calabar and other Nigerian ports.

Victoria (*Lat. 4° 00′ N., Long. 9° 12′ E.*), is connected to the general telegraph and telephone systems.

Charts 1456, 1860, 1357, 594, 2202a, 2203, 2127.

Chart 1455.

There is a good European and native hospital.

Trade.—The chief products are cocoa and palm oil.

CAPE NACHTIGAL TO CAP CAMEROUN. — Coast. — Beacon.—Man of War bay is contained between Cape Nachtigal and Reef point, situated about one mile eastward; it has depths of less than 3 fathoms ($5^{m}5$).

There is a beacon on Little Koppen hill, situated about one mile north-eastward of Reef point.

Cape Bimbia, situated about three-quarters of a mile south-eastward of Reef point, is the southern extremity of the base of the Cameroons mountains, the land behind it rising gradually and regularly from the coast.

Fish point is situated about three-quarters of a mile north-eastward of Cape Bimbia and about 1½ miles further in the same direction is Dikullu point; between these two points is a shallow bay, in the entrance to which is Nicol island, 240 feet ($73^{m}1$) high, thickly wooded, with a shoal bank extending from its north-eastern side and shoal patches between it and the coast; the northern and southern extremities of the island are moderately high and there is a low plain between them.

Dikullu bay is entered between Dikullu point and Pegel point, situated about three-quarters of a mile north-eastward; this bay is very shallow. Three cables north-eastward of Pegel point is Entrance point, at the mouth of Bimbia river.

Anchorages.—Small vessels may find sheltered anchorage, in depths of about 1¼ fathoms ($2^{m}3$), between the western side of Nicol island and King William town, situated close northward of Fish point. There is a landing place near the British factory half a mile northward of the town.

Anchorage may be obtained off Dikullu bay, in depths of about 4 fathoms ($7^{m}3$); it is said to be perfectly safe.

Bimbia river. — Buoyage. — Cautions. — The entrance to Bimbia river lies between Entrance point (*Lat. 3° 58′ N., Long. 9° 17′ E.*) and the coast about half a mile eastward. The approach is obstructed by a bar lying south-eastward of Cape Bimbia. In April 1948, the bar under calm conditions could be crossed at high water spring tide by vessels drawing 20 feet ($6^{m}1$), and at high water neap tides, by vessels drawing 18 feet ($5^{m}5$).

Mariners are reminded that a ground swell of varying amplitude usually prevails on the exposed bar of Bimbia river. Masters are strongly advised to adjust the draught of their vessels on this account, and to ensure that in all circumstances they have a minimum clearance of one foot ($0^{m}3$) under the keel.

Two black can buoys, Nos. 1 and 2, are moored, respectively, about three-quarters of a mile south-westward and one mile east-south-eastward of Cape Bimbia.

When approaching the entrance to the river, the first factories seen are those of Bamba plantation, consisting of some large white buildings with white roofs, situated on the coast northward of Nicol island; afterwards the British factory, a small white house with a grey metal roof, situated near the shore northward of Money village, will open out.

Charts 1456, 1860, 1357, 594, 2202a, 2203, 2127.

Chart 1456.

The river connects Tiko and Missallelle, in Lac aux Mouettes, with the sea.

Above Lac aux Mouettes the river is known by the name of Mungo river, its course winding round the foot of Cameroons Mountains and then pursuing a general northerly direction to its source near Ekangte (*Lat. 5° 02′ N., Long. 9° 41′ E.*); *see* pages 122 and 123.

The river is connected to Rivière Cameroun, through Baie Mocouchou and Baie Modeaca, by a number of creeks, of which Matumal, Victoria, Tende, Nyubanan Yau, Mbakwele, Micanje, Mbosa Bombe, and Mokola are the most important, *see* page 122.

Chart 1455.

Above Entrance point the river deepens to as much as 10 and 11 fathoms (18^{m}3 and 20^{m}1) in places; a mid-channel course should be steered.

Rocky point is situated about 8 cables north-north-eastward of Entrance point, and between these points there is foul ground. Great bay, in which there is foul ground and depths of between a quarter of a fathom and 1½ fathoms (0^{m}5 and 2^{m}7), is contained between Rocky point and a projecting headland about 1½ miles east-north-eastward. Depths of less than 3 fathoms (5^{m}5) extend nearly one cable offshore from this headland, 6 cables eastward of which is situated Schiess islet (*Lat. 4° 00′ N., Long. 9° 20′ E.*), a small mangrove islet, situated on the north-eastern side of the entrance to Matumal creek.

A white conical buoy is moored in a position about 2 cables south-westward of the western point of Schiess islet, to mark a shelf with depths of less than one fathom (1^{m}8) over it, which extends south-westward of the islet.

About 6 miles above the mouth of the river is the mouth of a narrow creek which is navigable at high water by boats drawing up to 6 feet (1^{m}8), and is a short cut to Tiko.

At the same point, the river itself takes a sharp turn to the south-eastward for about one mile, and thence turns again sharply north-north-eastward for just over one mile.

These sharp turns must be negotiated with great caution.

The river then turns east-north-eastward for about one mile, to Tiko pool, the main channel running thence to Missallelle and Lac aux Mouettes, while the deep channel to Tiko branches off in a northerly direction for about 1½ miles.

In 1940, there was a depth of about 22 feet (6^{m}7) in mid-channel to Tiko wharf.

Pilotage.—If required, a government pilot can be obtained at Victoria for Bimbia river.

Chart 1455, plan of Tiko island.

Tiko island.—Wharf.—Tidal streams.—The western end of Tiko island is joined to the mainland by a narrow causeway carrying the light railway, which links up the sawmills and plantations in the vicinity with the wharf.

Tiko wharf (*Lat. 4° 04′ N., Long. 9° 24′ E.*) is situated at the eastern end of the island; it is 397 feet (121^{m}0) long. There is a dolphin at each end of the wharf and two strong bollards on the shore; a buoy is laid off the upper end of the wharf for warping off. In 1940, there was a depth of 15 feet (4^{m}6) alongside the wharf.

Minor repairs to small craft can be executed.

Charts 1860, 1357, 594, 2202a, 2203, 2127.

Chart 1455, plan of Tiko island.

The outgoing tidal stream runs very strongly and tends to throw a vessel off the wharf. Vessels should go up the river on the last of the ingoing stream, let go an anchor under foot southward of the wharf, swing to the ingoing stream, and then drop alongside.

Ocean going vessels enter the port of Tiko once or twice a week. The import of goods by the plantation companies in the Tiko district, and on the banks of the navigable part of the Mungo river, have increased considerably of late years. The principal export is bananas.

A native town has been laid out at Tiko, it is situated on the mainland, close to the causeway. Boats drawing up to 7 feet ($2^{m}1$) can reach the town at high water, but should not approach the little pier at the causeway, which dries, within one cable.

In 1948, there were 8 dumb-lighters.

The heat is very oppressive, especially on the island.

Crocodiles abound in the rivers and creeks.

Chart 1456.

Coast.—From the entrance to the Bimbia river the coast curves round in a south-easterly to north-easterly direction for about 14 miles to Cap Cameroun ; the shore is low and covered with mangroves, but it is visible in clear weather for a distance of about 12 miles.

Bancs Bimbia, over which the depths are less than 3 fathoms ($5^{m}5$) and on which the sea breaks heavily, fringe this portion of the coast and extend as much as 5 miles offshore.

RIVIÈRE CAMEROUN.—Approach.—The approach to the estuary of Rivière Cameroun is between Bancs Bimbia and the Têtes de Chiens shoals. These shoals lie on the eastern side of the channel, and are situated with their northern end about 3¼ miles southward of Cap Cameroun, from whence they extend in a south-westerly and southerly direction for about 5 miles. The sea always breaks on them, except at slack high water, and they can be seen from a distance, but they are very dangerous to low-powered vessels caught in the entrance by the outgoing tidal stream, which rushes with considerable velocity over them, especially at spring tides.

The outer bar of Rivière Cameroun extends from the south-western end of the Têtes de Chiens shoals to the southern extremity of Bancs Bimbia, and has a least depth of 4 fathoms ($7^{m}3$) over it on the recommended track.

Têtes de Chiens shoals are steep-to on their north-western side, depths of from 10 to 12 fathoms ($18^{m}3$ to $21^{m}9$) being found at barely a quarter of a mile from them.

The entrance to the estuary is between Cap Cameroun, a low but well-defined point, the extremity of which is crowned by large bare trees, and Pointe Souelaba (*Lat. 3° 49′ N., Long. 9° 33′ E.*), situated about 7 miles south-eastward.

Pointe Souelaba is a singularly long, low, and narrow point, which is gradually being eroded by the action of the sea, and for this reason it cannot be considered as a good landmark. The trees within a quarter of a mile of its extremity appear much thinned out and ragged, while at the point itself, only the trunks remain.

A shelf, with depths of less than 3 fathoms ($5^{m}5$) over it, extends about 1½ miles southward from Cap Cameroun, and a detached shoal with depths of 2¾ fathoms ($5^{m}0$) over it, lies about 2 miles southward of that point.

Charts 1860, 1357, 594, 2202a, 2203, 2127.

Chart 1456.

A long shoal spit, with depths of less than 2 fathoms ($3^{m}7$) over it, extends for about 3½ miles north-westward of Pointe Souelaba, and a 1½-fathom ($2^{m}7$) patch lies about 4 cables farther northward.

There are depths of as much as 13 fathoms ($23^{m}8$) in the main channel between these shoals, the edges of which are steep-to, and care should therefore be taken to avoid approaching them too closely.

Local Magnetic Anomaly.—The land in the vicinity of Cap Cameroun is magnetic, and a local magnetic anomaly exists between light-and-whistle-buoy " A " (*see* below) and the wreck barrage referred to on page 123.

Anchorage in approach.—If obliged to do so, a vessel can anchor off the bar of Rivière Cameroun out of the strength of the tide, and ride easily in a depth of 6½ fathoms ($11^{m}9$), with Cap Cameroun bearing 037°, distant from 12 to 13 miles.

A vessel may anchor off this coast at all seasons of the year, but never in depths of less than 7 fathoms ($12^{m}8$), except in case of necessity, for in less than that depth the swell begins to assume the character of rollers, and causes the vessel to ride very uneasily.

Vessels may also anchor in the vicinity of light-and-whistle-buoy " A," *see* below.

Buoyage.—The positions of the buoys are altered as required to meet changes in the Channel; their charted positions cannot therefore be relied upon.

Entering from seaward, black buoys should be left on the starboard hand, and red buoys on the port hand.

A pillar light-and-whistle-buoy, marked " A," painted in black and white vertical stripes, and exhibiting a *white flashing* light *every six seconds,* is situated about 10½ miles south-south-westward of Cap Cameroun.

A can light-buoy, marked " B," painted red and exhibiting a *red flashing* light *every six seconds,* is situated about 7 miles south-south-westward of Cap Cameroun.

A conical light-buoy, marked " C," painted black and exhibiting a *green flashing* light *every six seconds,* is situated about 3½ miles south-south-westward of Cap Cameroun.

A can light-buoy, marked " D," painted red and exhibiting a *red flashing* light *every six seconds,* is moored about 2 miles south-south-eastward of Cap Cameroun, and about 6 cables eastward of the 2¾-fathom ($5^{m}0$) patch situated about 2 miles southward of Cap Cameroun.

A can light-buoy, marked " Base," painted red and exhibiting a *white flashing* light *every six seconds,* is situated about 4 miles eastward of Cap Cameroun (*Lat.* 3° *54′ N., Long.* 9° *29′ E.*).

Pilotage.—Above the Base light-buoy, pilotage in Rivière Cameroun is compulsory. The request for a pilot should be made by radio, either to the vessel's agent or to the Captain of the Port at Douala, and should include the draught of the vessel, and the expected time of arrival at the Base light-buoy, where the pilot will be found. This signal should be made 6 hours before it is desired to pick up the pilot.

The pilot boat is a grey motor launch with a white canopy, which displays the pilot flag of the International Code of Signals during daylight hours.

Charts 1860, 1357, 594, 2202a, 2203, 2127.

Chart 1456.

Native pilots for the creeks can be obtained, but should not be engaged without consulting the Captain of the Port.

Directions.—The following directions are given as far as the Base light-buoy, above that point the positions and characteristics of the buoys, which are liable to alteration, are described on page 124.

If coming from westward and the weather is not clear, it is advisable to ascertain the position of the vessel by making the land near Debunja point; or, if from the southward, by making that near Ambas bay, before attempting to make the outer light-and-whistle-buoy " A."

When Cap Cameroun (*Lat. 3° 54′ N., Long. 9° 29′ E.*), is sighted, it should be steered for, bearing 031°, until light-and-whistle-buoy " A " is seen, when pass about one cable eastward of the buoy. From this buoy, steer 020° for light-buoy " B," passing close eastward of it, and then steer 043° to pass westward of light-buoy " C," from which a course about 060° may be steered for " Base " light-buoy, which leads southward of light-buoy " D."

Têtes de Chiens shoal being steep-to, it is preferable to keep slightly on the northern side of the channel when in their vicinity.

When Pointe Manoca, situated about 6 miles east-north-eastward of Pointe Souelaba, bears 090°, the " Base " light-buoy should be steered for.

Anchorage may be obtained, while waiting for a pilot, in a position about half a mile southward, or south-south-eastward of the " Base " light-buoy. This anchorage, known as Souleaba anchorage, is useful for vessels unable to ascend the river to Douala. If the water should be very choppy, vessels sometimes anchor off Manoca, *see* page 123.

At high water, spring and neap tides, vessels drawing up to 21 and 19 feet ($6^{m}4$ and $5^{m}8$) respectively, should be able to ascend the river to Douala.

Tides and Tidal streams.—The in-going stream attains its maximum strength about 2 hours before, and the out-going stream about 4 hours after, the time of high water at Bonny Bar (*see* Admiralty Tide Tables). The maximum strength of either stream is usually about 2½ knots at springs, but during the rainy season the out-going stream may run for as long as 8 hours, attaining a maximum rate of 2¾ knots, and the in-going for only 4½ hours at a maximum rate not reaching 2 knots.

In the actual entrance, southward of Cap Cameroun, and between " Base " light-buoy and light-buoy " C," the out-going stream sometimes reaches 5 knots at springs.

Between the " Base " light-buoy and the next buoy north-north-eastward of it, the in-going stream sets eastward and the out-going stream westward.

The out-going tidal stream sets strongly towards the Têtes de Chiens shoals, and mariners are cautioned against getting too close to the eastern side of the channel.

In the dredged channel in the approach to Douala, *see* page 124, the in-going stream sets north-eastward on to the red beacons, and the out-going stream sets south-westward on to the black beacons.

The level of the river in the rainy season is 1½ feet ($0^{m}4$) higher than in the dry season.

Winds and weather.—During the dry season, the south-westerly sea breeze may attain a force of about 5, and, during the out-going

Charts 1860, 1357, 495, 2202a, 2203, 2127.

Chart 1456.

stream at spring tides, produces a very nasty short sea, which is dangerous to small launches, especially in the vicinity of the " Base " light-buoy. *See* also Climatic table: page 71.

Estuary of Rivière Cameroun.—Within the entrance, the estuary of Rivière Cameroun comprises Baie Mocouchou and Baie Modeaca on its north-western side, and Crique Malimba and Baie de Manoca on its south-eastern side, whilst the main channel extends in a north-easterly direction from the " Base " light-buoy.

Baie Mocouchou is a bight entered between Cap Cameroun and Pointe Mianjou (*Lat. 3° 58′ N., Long. 9° 32′ E.*), 4¼ miles north-eastward, the southern extremity of an island of the same name. At its head is Crique Micanje, the principal of the eastern entrances to Matumal creek, which communicates with Bimbia river and is navigable by vessels drawing up to 13 feet ($4^{m}0$).

Crique Victoria and Crique Tende, the entrances to which are on the western side of the bay, are both small, but also connect with Matumal creek. Crique Victoria is navigable by vessels drawing up to 9 feet ($2^{m}7$), but it is very narrow and tortuous.

Baie Modeaca is entered between Pointe Mianjou and Pointe Moukalatanda about 4½ miles north-eastward; the latter point is covered with green bushes, and is the south-eastern extremity of an island. The channel through Baie Modeaca leads to Lac aux Mouettes and to the entrance to Mungo river. At high water, launches from Douala can proceed to Matumal creek through this bay, using either Crique Mboca or Crique Mbosa Bombe, which routes are shorter and more sheltered than that through Baie Mocouchou, but not so deep.

The settlement of Missallelle is built on the shore at the north-western corner of Lac aux Mouettes. There is a wharf, with a crane, but it can only be reached by small boats of shallow draught.

Mungo river is navigable by small launches and shallow draught vessels at all seasons as far as Mpundu (*Lat. 4° 13′ N., Long. 9° 26′ E.*), but the bar at its entrance in Lac aux Mouettes is only passable in the dry season by vessels drawing not more than 3 feet ($0^{m}9$). There is a beach at Mpundu and a wharf with a crane.

Crique Malimba, on the south-eastern side of the estuary, is entered between Pointe Souelaba and Pointe Manoca, situated about 5¾ miles in an east-north-easterly direction; near the mouth of the creek are several wooded islets, amongst which are Kule Kule and Minjame.

Baie de Manoca. — Buoyage. — Wharf. — Pilots. — Light. — Baie de Manoca is an extensive shallow bay contained between Pointe Manoca (*Lat. 3° 52′ N., Long. 9° 37′ E.*) and Pointe Malimba, situated about 4¾ miles northward.

At Pointe Manoca there is a wharf and a sawmill, and at the head of the bay are the mouths of Crique Kwakwa and Crique N'Donga. Rivière Loungasi flows into its north-eastern side.

The minimum depth of water in Manoca channel, in 1949, was reported to be 14½ feet ($4^{m}4$). This channel should only be used by day with a pilot; the latter will await a vessel at " Base " light-buoy if requested by radio.

The channel is marked by five black buoys, and by one red buoy surmounted by a cylindrical topmark.

The tidal streams in the channel must be allowed for: the outgoing stream runs westward with considerable strength, and tends

Charts 1860, 1357, 594, 2202a, 2203, 2127.

Chart 1456.

to set a vessel on to the southern side of the channel at the time of its maximum rate, which is about 5 hours after high water, i.e., 5 to 6 hours after high water at Bonny bar. The in-going stream runs east-north-eastward with less strength.

There is good anchorage, sheltered from the swell, in a depth of 33 feet (10$^{\text{m}}$1), over sand and mud, about 2¾ cables from the head of the wharf at Manoca, along the prolongation of the line of the pier. There is a mooring buoy for lighters.

The out-going stream is very strong at this anchorage, sometimes as much as 5 knots, and it is well to veer plenty of cable.

There is a flagstaff at Manoca, painted white, which carries a vane to show the direction of the wind when aircraft are expected. A light is occasionally exhibited from the head of the wharf.

The church and the European houses are visible when approaching the anchorage, but the village is hidden by the mangroves.

There are several 1½ ton cranes on the wharf.

No supplies are available.

Crique Kwakwa connects the estuary of Rivière Cameroun with Rivière Sanaga, and it can be navigated by large steam launches in the rainy season, but in the dry season it is impassable.

The current in Crique Kwakwa always sets northward at 2 to 3 knots.

Crique N'Donga is navigable by small craft as far as M'Banda, about 11 miles above its mouth.

Rivière Loungasi is navigable for about 31 miles by boats at all seasons, as far as the small town of Yapoma, and by canoe as far as Dibamba.

Barre du milieu and Rivière Cameroun above Pointe Olga.—Caution.—Rivière Wouri is the name given to the main channel of Rivière Cameroun which enters the estuary between Pointe Moukalatanda (page 122) and Pointe Olga, situated about 9¾ miles east-north-eastward of Cap Cameroun (*Lat. 3° 54′ N., Long. 9° 29′ E.*).

Throughout the length of the river, heavy driftwood may often be encountered.

Between these points Rivière Wouri is about 3 miles wide, but it contracts gradually, until, on reaching Pointe Bonaberi opposite Douala and about 7 miles up stream, its width is about 6 cables.

Shoal water, forming the middle bar of the river, extends from a position about 4 miles eastward of Cap Cameroun to the southern end of The Pool, situated about 1¾ miles northward of Pointe Olga.

A barrage of sunken wrecks is situated about 1½ miles south-south-westward of Pointe Moukalatanda.

The entrance to Crique Bwapé, on the north-western side of the river, is situated about 2½ miles east-north-eastward of Pointe Moukalatanda. Banc Bwapé is a sandy bank extending a considerable distance from this point; it has only a depth of one foot (0$^{\text{m}}$3) on its outer edge, 6 cables south-eastward of the southern entrance point of the creek.

Crique Moungo (Mungo), which connects with the Mungo river, enters Rivière Cameroun about 2½ miles above Crique Bwapé; it is navigable by canoes, and, at high water by small launches.

Crique Olga and Crique Prisoua a Loba are both connected with Rivière Loungasi, and enter the main stream of the Rivière Cameroun, the former immediately northward of Pointe Olga, and the latter close

Charts 1860, 1357, 594, 2202a, 2203, 2127.

Chart 1456.

northward of Pointe Docteur (*Lat. 4° 01′ N., Long. 9° 40′ E.*), 3½ miles north-eastward.

Dredged channels. — Buoyage. — Beacons. — Lights. — There are two dredged channels to be negotiated when approaching Douala from " Base " light-buoy.

Outer channel.—The outer channel which is constantly dredged, and which had, in 1950, a depth of 13½ feet (4^{m}1) and a bottom of soft mud, lies between a position 2½ miles west-south-westward of Pointe Olga, and a position about 1¾ miles northward of the same point.

No. 1, black conical buoy, to be left on the starboard hand when entering, is moored in a position about 5¼ miles east-north-eastward of Cap Cameroun. There is a beacon about three-quarters of a mile farther eastward.

No. 2, " Mianjou," buoy painted in red and white horizontal stripes and exhibiting a *red flashing* light *every six seconds*, is moored in a position about 3½ miles south-westward of Pointe Olga.

No. 3 black beacon, situated at the south-western end of the outer channel is about 2½ miles west-south-westward of Pointe Olga. Black beacons Nos. 5, 7, 9, and 11 are situated about three-quarters of a mile apart on the south-eastern side of the outer channel, which runs in an 041° direction for about 3½ miles from No. 3 beacon.

Lights are exhibited from beacons Nos. 3, 5, 9 and 11.

The north-western side of the outer channel is marked by red can buoys of which No. 4 is in a position about 2½ miles west-south-westward of Pointe Olga, and Nos. 6, 8, 12 and 14 lie between half and 1¼ miles apart, north-eastward of No. 4 buoy; No. 14 buoy being in a position about 1¾ miles northward of Pointe Olga. Buoys Nos. 4, 8 and 14 exhibit *fixed red* lights.

When in the outer channel vessels are advised to keep way on, to avoid choking of condenser inlets.

On clearing the inner end of outer channel, vessels should steer to leave red can buoy No. 16, " Pool," which exhibits a *red flashing* light *every six seconds*, to north-westward, and then steer for the western entrance of inner channel which lies about one mile northward of Pointe Docteur.

Inner channel.—The inner channel, which has a depth of 13½ feet (4^{m}1) over a bottom of hard clay, lies between a position one mile northward of Pointe Docteur, and a position about 1¾ miles north-eastward of the same point.

The north-western side of the inner channel is marked by red beacons Nos. 18 and 22. The south-eastern side of the inner channel is marked by black beacons; No. 13, being in position about one mile northward of Pointe Docteur, and Nos. 15 and 17 beacons being respectively 5 and 10 cables east-north-eastward of No. 13 beacon.

Lights are exhibited from beacons Nos. 13, 15, and 17.

The pilot will give any information on changes in depths of water or positions of buoys.

Douala.—This town (*Lat. 4° 03′ N., Long. 9° 42′ E.*) is situated on elevated ground about 30 feet (9^{m}1) in height, on the south-eastern bank of the Rivière Wouri, about 15 miles above Cap Cameroun. The principal buildings are Government House and its offices, the hospitals, barracks, law courts, and the cathedral; the white domes of the latter may be seen in clear weather from Pointe Souelaba.

Charts 1860, 1357, 594, 2202a, 2203, 2127.

Chart 1456.

The town is divided by a railway cutting, the part south-westward of the railway being known as Bell, and the north-eastern part as Akwa; a bridge over the cutting connects the two.

There is a hospital for Europeans and another for natives.

In 1937, the population was 18,000, of whom 600 were Europeans.

There is a British Consular Officer at Douala.

Lights.—A light is exhibited, at an elevation of 26 feet (7^{m}9), from a red metal pylon on Astréa wharf, Akwa.

A light is exhibited at an elevation of 115 feet (35^{m}0) from a similar structure situated close southward of Deido church tower, about one mile north-eastward of the front light.

These lights in line, bearing 055½°, lead through the inner dredged channel which leads to the deep water wharf off Douala, *see* pages 123 and 124.

A light is exhibited from a grey water tower (*Lat. 4° 03′ N., Long. 9° 42′ E.*), situated about half a mile southward of the light on Astréa wharf, in line with which, bearing 172°, it leads through the channel to Bonaberi, *see* page 126.

Port facilities.—Special regulations are in force in the port, the nature of which should be ascertained on arrival.

There are 5 mooring berths in the river opposite the town for vessels which do not wish to go alongside the quays.

There is also anchorage for five ocean-going vessels, with good holding ground.

A quay extends for 1,804 feet (550^{m}0) along the river front at which there is berthing space for four large vessels, with depths alongside of from 23 feet (7^{m}0) to 33 feet (10^{m}1). This quay is continued up river by the Quai du Chalandage, 630 feet (192^{m}0) in length, for the use of lighters, where the depths alongside are from 3 to 10 feet (0^{m}9 to 3^{m}0). These quays are connected to the railway system.

There are a number of power-operated cranes ranging in capacity from one to 16 tons, as well as two large floating cranes of capacities 60 and 200 tons. There are three tugs, four self-propelled lighters and about 50 dumb-lighters.

Repairs.—There is a floating dock and also a patent slip at Douala, *see* Appendix II. Small repairs to machinery can be executed.

Supplies.—The water in the river is very dirty and bad, although it is said to be fit for boilers if taken at low water. The drinking water supplied to the town is good, but should be boiled before use; it may be taken in alongside.

Meat, bread, fish, and vegetables are plentiful. European provisions can be obtained.

Communications.—There is regular steamship communication with Europe.

Douala is connected to Yaoundé (*Lat. 3° 51′ N., Long. 11° 32′ E.*) by rail, and at Bonaberi there is another railway that runs to Nkongsamba.

Communication with the interior is maintained by a river service of small craft, and there is a regular ferry service to Bonaberi.

There is a radio station at Douala, *see* page 44. Douala is connected to the General Telegraph System.

Deratisation.—Facilities exist for deratisation of ships of up to medium tonnage.

Charts 1860, 1357, 594, 2202a, 2203, 2127.

Chart 1456.

Trade.—Timber, coffee, palm oil, animal products and bananas are the chief exports.

Foodstuffs, manufactured tobacco, wines and spirits, furniture, etc., are imported.

Climatic table.—*See* page 71.

Rivière Wouri above Douala.—If proceeding to Bonaberi, or anchoring above the quays, it should be remembered that the greater depths are found on the eastern side of the river. The channel to Bonaberi is marked by four buoys, and the light on the water tower at Akwa, in line with that on the wharf already mentioned on page 125, lead through it.

There is a mooring berth in the river below Bonaberi, and, above a small quay for lighters, there is a wooden wharf 246 feet (75^{m}0) long, alongside which ships may lie in a depth of 26 feet (7^{m}9) at low water. There are three steam cranes on this wharf, of capacities 6, 10 and 12 tons.

Above Douala, Rivière Wouri receives the waters of the Rivières Abo and Sange. Wouri is navigable, during the rainy season, as far as Jabassi, a distance of 40 miles from the sea, but during the dry season only as far as Nono, 18 miles below Jabassi.

Rivière Abo is navigable for small steam vessels during the rainy season, as far as Miang, about 18 miles above Douala.

Charts 1860, 1357, 1361.

POINTE SOUELABA TO CABO SAN JUAN.—Coast.—From Pointe Souelaba, the general trend of the coast is in a south-south-easterly direction for 53 miles to Longji (Lonji), whence the direction is south-south-westerly for about 120 miles to Cabo San Juan on the northern entrance point of Bahia de Corisco.

Caution is necessary when navigating along the whole of this coast, and at times a heavy surf breaks all along it, making landing dangerous.

Between Rivière Cameroun and Rivière Campo, depths of 10 fathoms (18^{m}3) lie about 9 miles offshore, except between the parallels of 2° 55′ N. and 2° 35′ N., where they will be found from 2 to 3 miles from the coast.

This part of the coast is uniformly low and thickly wooded, and generally consists of a sandy beach, off which, in places are detached rocky patches. The large trees of the forests which line the coast are visible from seaward at a distance of from 12 to 15 miles.

Chart 1361.

Aspect.—The background is more elevated in the central and southern portions of the coast between Rivière Cameroun and Bahia de Corisco than in the northern.

Inland of Petit Batanga (*Lat. 3° 14′ N., Long. 9° 55′ E.*), at the mouth of the Rivière Njong (Nyong), which is situated about 12 miles north-north-westward of Longji, the land rises in three distinct plateaux, distant from the coast 3, 6, and 15 miles respectively. A gap or saddle, 3 miles in extent, separates the most distant and highest of these from another range of the same height, which lies similarly in a northerly and southerly direction. Between this last range and the coast, there is another range, of less elevation but also running in a northerly and southerly direction, which is about 8 miles in length.

Southward of Baie Panavia, the country rises in yet another series

Charts 594, 2202a, 2203, 2127.

Chart 1361.

of more elevated ranges containing several remarkable peaks. Mont Nisus, situated about 12 miles south-eastward of Longji, has the form of a truncated cone ; it is a high isolated hill, and, although it belongs to a more distant range than Mont Éléphant, may be easily identified from seaward.

Mont Éléphant, at the northern end of a coastal range, is 1,707 feet (520m3) high, and is situated about 8 miles inland and 17 miles south-south-eastward of Longji ; when seen from the westward it has a remarkable resemblance to a recumbent elephant, and when viewed from southward it appears in the form of a cone, *see* view facing page **113.**

Les Mamelles, as indicated by their names, are paps ; they are of equal elevation and are situated near the centre of a range of hills which extends southward from Mont Éléphant, and runs parallel with the coast for about 7 miles inland, for a distance of about 17 miles.

Mont Alouette (*Lat. 2° 25′ N., Long. 10° 10′ E.*) rises to an elevation of 3,415 feet (1,040m1) south-eastward of Les Mamelles.

Eastward of the southern end of these hills, the plateaux rise to Colline Selle and Colline Table (Saddle and Table hills) which are situated about 24 and 27 miles, respectively, inland from the mouth of the Rivière Campo. Colline Table is the southernmost, and they are both remarkable and appear to be isolated when seen from a distance.

About 18 miles inland from Punta Bata, which is situated about 13 miles southward of the mouth of Rivière Campo, and slightly southward of the parallel of latitude passing through it, are two small conical hills which adjoin the northern part of the chain known as Las Siete Colinas (The Seven hills). This mountain range, which follows the curve of the coast, at a distance of about 15 miles inland, for a distance of about 27 miles, is very remarkable. When viewed from seaward, it presents, as its name implies, seven distinct elevations.

Sharp peak, the central mountain, is 2,786 feet (849m2) high.

Midway between Las Siete Colinas and the coast, and about 17 miles south-eastward of Punta Bata, is Monte de Bata, a remarkable conical hill, which, however, is sometimes obscured by mist in the morning ; *see* view facing page **113.**

About 12 miles southward of the southern extremity of Las Siete Colinas is a remarkable mountain with a double summit named La Mitra (The Mitre), which attains an elevation of 3,940 feet (1,200m9).

Charts 1860, 1357.

Rivière Sanaga.—This river, about 17 miles south-south-eastward of Pointe Souelaba, has two mouths, which are separated by Ile Malimba and are about 2½ miles apart. The islands and sandbanks at the mouths of the river undergo continual changes ; during the rainy season new mouths are formed through the banks, but the two chief channels remain, though alterations are frequent. Rivière Sanaga is connected to Rivière Cameroun by Crique Kwakwa, *see* page 123.

A lagoon, about 2½ miles in length, is situated close to the coast about one mile northward of Bouche Benge.

There are factories near the entrances on both sides of the river, and also on Île Malimba near its seaward end (*Lat. 3° 33′ N., Long. 9° 39′ E.*).

Charts 594, 2202a, 2203, 2127.

Charts 1860, 1357.

The town of Edea is situated about 45 miles up the river, and is connected to Douala by the railway line which runs to Yaoundé (page 125).

Lac Ossa, a large expanse of water situated 6 miles westward of Edea is useful for landing seaplanes, but communication with Edea can only be made by canoe.

Small steam vessels may ascend Rivière Sanaga at high water to Edea, but the ascent will probably not be made without grounding, as there are several shallows in the first 15 miles of the river.

Bouche Benge (Benge mouth) is reported to be barred by a sandbank within its entrance, over which is a depth of only 2 feet ($0^{m}6$), but it is also stated to be generally available for boats.

At one mile outside the bar, there are depths of from 7 to 9 feet ($2^{m}1$ to $2^{m}7$), and only about 2¾ fathoms ($5^{m}0$) at a distance of 2 miles offshore. During the floods caused by the rains, the stream always runs out of the river; a rate of 4 knots is attained on the out-going stream, which the in-going stream reduces to about 3 knots.

Bouche Boungo (Bungo mouth), the southern entrance situated about 19 miles south-south-eastward of Pointe Souelaba, is that principally used, although the entrance is obstructed by a dangerous bar on which the sea breaks heavily.

Anchorages.—In Bouche Benge, anchorage may be obtained, by vessels with local knowledge, in a depth of about 2 fathoms ($3^{m}7$) about three-quarters of a cable from the shore, off the westernmost building of the former Woermann factory, which is now a fishery school. This anchorage is well sheltered by the southern entrance point, but the holding ground is bad.

Vessels with local knowledge may obtain anchorage in Bouche Boungo in depths of from 3¼ to 8 fathoms ($5^{m}9$ to $14^{m}6$), good holding ground, with the German factory, at which there is a flagstaff, bearing 082°. Small craft can find good shelter behind the sandbank at the entrance to Bouche Boungo.

Charts 1357, 1361.

Baie Panavia.—Anchorage.—From Bouche Boungo of Rivière Sanaga to Pointe Garajam, the southern entrance point of Baie Panavia, the coast curves for about 37 miles in a general south-south-easterly direction. In the bay the depths vary from about 5 to 7 fathoms ($9^{m}1$ to $12^{m}8$), at distances of from 3 to 6 miles offshore. Secure anchorage may be found by vessels with local knowledge anywhere off the shore of the bay, in depths of from 5 to 6 fathoms ($9^{m}1$ to $11^{m}0$), mud, because on this coast the Tornadoes blow offshore.

Dangers.—A spit, over which the depth is 2¾ fathoms ($5^{m}0$), extends about 3 miles westward from a position on the coast about 10 miles northward of Pointe Garajam. A detached shoal with a depth of 2½ fathoms ($4^{m}6$) over it, lies 5½ miles north-westward of Longji light, *see* page 129.

Rivière Njong.—The entrance to Rivière Njong is scarcely visible from seaward, and is situated about 23 miles south-eastward of Bouche Boungo. The only guide to the entrance is Mont Beoundo, the first hill near the coast southward of Cameroons mountains, which is situated about 4½ miles south-eastward of the mouth of the river. There is a bar at the entrance over which, in 1916, the depth was 9 feet ($2^{m}7$), but the channel is subject to frequent changes.

Charts 594, 2202a, 2203, 2127.

Charts 1357, 1361.

Petit Batanga (*Lat. 3° 14′ N., Long. 9° 55′ E.*), the houses of which are scarcely visible from seaward, is situated on a low tongue of land which forms the southern side of the entrance to the river. There are two small factories on the left bank of the river, about 1½ miles above the bar, but these also are hidden by the bush, and no native huts are visible from seaward. Fish abound in the river.

Small steam vessels can ascend the river as far as the village of Dihani about 25 miles, but may touch the ground in places. Some falls a few miles above Dihani prevent further navigation.

Anchorage.—Directions.—Good anchorage will be found, by vessels with local knowledge, in depths of from 4 to 5 fathoms (7^m3 to 9^m1), sand and mud, with Mont Beoundo bearing about 082°.

It is not advisable to attempt to cross the bar of the river without sounding it, or obtaining assistance from the factories. To enter the river, a low cluster of bushes on the right bank should be steered for until the entrance is completely open ; the vessel will then be inside the breakers, and the factory can be steered for. The passage is better during the dry than the wet season.

Chart 1361.

Rivière Lokoundje.—The mouth of this river is situated about 3½ miles southward of that of the Njong river. Rivière Lokoundje (Lokunji) is entered across a bar, over which there is a depth of 7 feet (2^m1) at half-tide, and is navigable for some distance by vessels drawing up to 7 feet (2^m1); but it is more difficult than the Rivière Njong. The village of Ebea is situated on the north bank about 14 miles from the entrance, where the river is about 2 miles wide. Ebea is connected by road with Edea, Dihani and Longji.

Longji.—Light.—This place, where there are British and German factories, is situated about 11 miles south-south-eastward of Petit Batanga, and is prominent from seaward.

Vessels approaching Longji (Lonji) from northward should not get into depths of less than 5 fathoms (9^m1) until they are southward of the point which projects about half a mile south-westward of the village. The anchorage is in a depth of about 4 fathoms (7^m3), mud, off the settlement.

A light is exhibited at the factory when a vessel is expected.

Roche Plantation and factories.—Buoy.—Plantation factories are situated about 4 miles southward of Longji. One of the factories is a white house, situated on a hill, and is particularly prominent from seaward ; its lights also may sometimes be seen.

Roche Plantation, which dries, lies half a mile offshore abreast the factories ; southward of it there are several other rocks which are very dangerous to small vessels and boats ; by keeping in depths of over 4½ fathoms (8^m2), vessels will be outside them. A white barrel buoy is moored on the seaward side of Roche Plantation, and two beacons, erected on the coast abreast the rock, when in line lead clear of it.

Anchorage.—Vessels with local knowledge should approach the anchorage off Roche Plantation by keeping the beacons in line, and anchor when the conspicuous white factory bears more than 125°, where good holding ground of dark green clay will be found ; southward of this bearing the bottom is foul ; the anchorage is marked by a black conical buoy.

Charts 594, 2202a, 2203, 2127.

Chart 1361.

Small vessels will find a secure and calm anchorage behind the northernmost rock, with the factory bearing 155°.

Coast.—Pointe Garajam (*Lat. 3° 00′ N., Long. 9° 56′ E.*) is low and wooded, and, being round in shape is somewhat difficult to distinguish from a distance, but on the beach are some rocks, which show up distinctly against the white sand of which the former is composed.

Abreast Pointe Garajam, and about one mile offshore, are two groups of rocks, one of which is above water, and on both of which the sea breaks.

From Pointe Garajam the coast trends in a south-south-westerly direction for about 40 miles to the mouth of Rivière Campo.

For a distance of 23 miles southward of Pointe Garajam the coast has a fine beach without mangroves, but rocks extend for a distance of half a mile offshore in many places; it is desirable therefore to keep a good offing of at least 2 miles, or in depths of from 12 to 14 fathoms (21^{m}9 to 25^{m}6).

Further southward, the foreshore consists of a long narrow strip of densely wooded lowland, fronted by a beach of yellow sand which is interrupted in places by what appear to be the mouths of small rivers.

Here and there, patches of a lighter green give evidence of plantations, and groups of brown huts prove the coast to be inhabited. Several landing places are indicated on chart 1361 near the various villages.

Off this coast the depths decrease gradually towards the shore; the bottom is generally clean, and consists of sand and mud, forming good holding ground, though in places there are patches of coral; the nature of the bottom should therefore be ascertained before anchoring.

Chart 1361, plan of Rade de Kribi.

Rade de Kribi.—Lights.—This harbour, situated about 4 miles southward of Pointe Garajam (*Lat. 3° 00′ N., Long. 9° 56′ E.*), is small and landlocked, providing excellent shelter for small craft. Rivière Kienké falls over a cliff from 20 to 30 feet (6^{m}1 to 9^{m}1) high, at the head of the harbour, and then forms a small basin which is protected on its seaward side by Margaret point, and is the port of Kribi.

There is a bar at the entrance to the harbour, which is subject to frequent changes, and, though dangerous at times, is passable at high water by small craft drawing up to 6 feet (1^{m}8). The least depth on the bar is 2 feet (0^{m}6). In bad weather the crossing should not be attempted except within half an hour on either side of high water.

Dangerous rocks, some of which dry 5 feet (1^{m}5), extend three-quarters of a cable north-westward of Margaret point, and should be given a wide berth.

A group of three detached rocks, awash, is situated in the middle of the approach channel, about one cable north-north-eastward of Margaret Point light-structure; the greatest care must be exercised to avoid these rocks, as even during a slight swell there are dangerous breakers upon them.

Within the harbour, Roches Wuri, which dry one foot (0^{m}3), situated close southward of Quai de Bruix, on the north side of the harbour, are the only dangers in the approach to the quay.

Charts 594, 2202a, 2203, 2127.

Chart 1361, plan of Rade de Kribi.

A light is exhibited, at an elevation of 59 feet (18^{m}0), from a white circular tower, about 49 feet (14^{m}9) in height, situated near the north-western extremity of Margaret point.

Chart 1361.

A light is exhibited, from a white pillar on Pointe Brima, about 7¾ cables north-north-eastward of Margaret Point lighthouse.

Anchorage.—Buoyage.—There is good anchorage outside the port in a convenient depth, sand and mud, with the Roman Catholic church, in the south-eastern corner of the harbour, in line with the lighthouse on Margaret point, bearing about 114°.

Two red conical buoys are moored, three-quarters of a mile apart, about 1½ miles north-westward of Margaret Point lighthouse.

Chart 1361, plan of Rade de Kribi.

The best anchorage for boats is about 40 yards (36^{m}6) southward of the pier head (*Lat. 2° 56′ N., Long. 9° 54′ E.*). Owing to the strong current and tide rips, it is not advisable to anchor in the greater depths at the head of the harbour.

The surface current at the entrance is largely influenced by Rivière Kienké, and consequently is always running out; its rate varies from 2 to 5 knots depending upon the state of the tide and the level of the river.

Kribi.—This town is the seat of a Resident and has a custom-house and post office; it is connected to the general telegraph system. The town consists of a number of European bungalows, native huts, and a hospital. Supplies are uncertain, though some native produce is usually obtainable. The principal exports are palm kernels, rubber, ivory, and cocoa; the imports are cotton goods, spirits, rice and salt.

There is regular steamer communication with Europe.

At the head of the harbour a bridge spans Rivière Kienké.

The large and conspicuous Roman Catholic church, which has a spire, stands close to the southern end of the bridge, and there is a convent near Margaret point.

Kribi is connected by road to Longji and Grand Batanga, and is connected to the general telegraph system.

Chart 1361.

Grand Batanga.—The village of Grand Batanga, with its factories, is situated about 7 miles southward of Pointe Garajam. The houses and churches are visible from seaward and form good marks. Grand Batanga is connected to the general telegraph system.

Dye woods, wax, and ivory are exported.

The American mission church and also a Roman Catholic mission are situated on a partially cleared hill. Just northward of the northernmost factory is the cascade of Rivière Lobé, which, in the rainy season and particularly when coming from northward, assists in identifying Grand Batanga, but in the dry season it is insignificant.

Pointe Banoko is situated 6 miles south-south-westward of Margaret point; there is a small stream just northward of the point, on which are several villages which are not visible from seaward.

Anchorage.—Landing.—The best anchorage off Grand Batanga available for vessels with local knowledge is in a depth of about 6 fathoms (11^{m}0), with the waterfall in line with the southern part of Mont Éléphant, *see* page 127, bearing 122°.

Charts 594, 2202a, 2203, 2127.

Chart 1361.

Anchorage may also be obtained in depths of from 5½ to 6½ fathoms ($10^{m}1$ to $11^{m}9$), grey sand, abreast the two southern large factories situated near Pointe Banoko, about 2 miles southward of the northernmost factory.

There is a landing place between the two southern factories, and boats are generally lying there; the landing is, however, dangerous and many lives have been lost in making the attempt.

Baie Banoko.—The shore of this slight indentation extends for about 5½ miles southward of Pointe Banoko, and has a sandy beach on which there are some factories; rocks, on which the sea breaks heavily, lie off its northern and southern points. In the northern part of the bay, depths of less than 3 fathoms ($5^{m}5$) will be found at a distance of over one mile from the coast.

The bay is easily recognised from its position in relation to Mont Éléphant. The shores of the bay are low and wooded, and near the centre is a thick clump of large trees which, from a distance, appear as a dark hillock. There is always a surf on the shore, and landing should never be attempted in a ship's boat.

The tidal streams are scarcely felt at a distance of 3 miles offshore.

Coast.—Wolf rock (*Lat. 2° 37′ N., Long. 9° 50′ E.*), 30 feet ($9^{m}1$) high, is small but remarkable; it lies at a short distance from the coast, about 13½ miles southward of Pointe Banoko; in shape it is a regular truncated cone, and it has a small beacon on its summit; it forms an excellent mark, and is surrounded by rocks on which the sea breaks violently.

In the neighbourhood of Wolf rock the bottom is foul; between it and the mouth of Rivière Campo the depths are not so regular as those northward, and depths of 5 fathoms ($9^{m}1$) extend at an increasing distance from the coast until abreast Pointe Weber, about 12 miles southward of Wolf rock, where they lie about 3½ miles offshore.

Pointe Gertrude is situated about 7 miles southward of Wolf rock; rocks over which the depth is less than 6 feet ($1^{m}8$) extend about 4 cables westward of this point.

Baie Campo.—**Shoals.**—Punta Campo is situated about 12 miles south-south-westward of Pointe Gertrude, and between the two the coast recedes to form Baie Campo, in the south-eastern corner of which is the mouth of Rivière Campo.

The depths in the bay are generally not more than from 2 to 2¾ fathoms ($3^{m}7$ to $5^{m}0$), decreasing gradually towards the shore and the mouth of the river. Off Pointe Weber, depths of 3 fathoms ($5^{m}5$) lie about 2½ miles from the coast, and rocks over which the depth is less than 6 feet ($1^{m}8$) extend one mile westward from the point.

A 1½-fathom ($2^{m}7$) patch lies about 2¼ miles westward of Pointe Weber.

Pointe Gertrude is low, sandy, and covered with trees; it does not possess any remarkable characteristics, and would be hard to distinguish but for the beacon on it. Landing may frequently be effected on the northern side of the point.

Punta Campo, though low and wooded with a sandy beach, forms a salient point of the coast, and is fringed with a line of breakers extending 7 cables offshore, which should be given a wide berth. Landing at the point is very difficult.

Rivière Campo.—This river, the native name of which is N'Tem,

Charts 594, 2202a, 2203, 2127.

enters the sea at the head of Baie Campo, about 3½ miles north-eastward of Punta Campo (*Lat. 2° 20′ N., Long. 9° 47′ E.*); and may be identified by its position with relation to the point, and also by Colline Selle and Colline Table, *see* page 127. It forms the northern boundary of Spanish Guinea, until the river reaches the parallel of 2° 10′ N., *see* page 4.

The factories, the white roofs of which are conspicuous from seaward, are situated at the Campo trading station on the northern bank of the river near its mouth; at the station there is a post and telegraph office and also a custom-house. On the southern bank there is a Spanish military post.

Off the point on the southern side of the mouth of the river, there is a drying reef on which the sea breaks heavily.

From the entrance, which is about one mile wide, the river extends in a south-easterly direction for about 12 miles; it then breaks up into various arms which are inaccessible from seaward on account of the Jengwe falls, situated about 8 miles from the coast. The river is tidal and navigable by boats as far as the falls.

The mouth of the river is obstructed by a bar, on which the sea usually breaks heavily, especially in the dry season; the depth over it is from 5 to 6½ feet ($1^{m}5$ to $2^{m}0$), and strangers should not attempt to cross it. Within the entrance, the river is wide and deep.

Good landing may usually be obtained just westward of the flagstaff on the southern side of the bay, even at times when the bar is impassable.

The surrounding district is inhabited principally by Mosekis, Bosyebas, and Pahouins. Ivory, rubber, and ebony are exported.

Anchorage.—Directions.—Anchorage, according to the draught of the vessel, may be obtained, near a red can buoy, with the factories bearing about 100°; but vessels should not anchor in depths less than 3 fathoms ($5^{m}5$) on account of the swell and cross current; with strong westerly winds this anchorage is almost untenable by small vessels.

In approaching this anchorage, if from northward, the shoal water off Pointe Weber should be avoided by bearings of Punta Campo; if from southward, the latter point should be given a berth of at least 2 miles.

Islas de los Pájaros.—A group of three rocks, about 18 feet ($5^{m}5$) high, named Islas de los Pajaros (Bird rocks) (*Lat. 2° 11′ N., Long. 9° 44′ E.*), lie in a depth of 9 fathoms ($16^{m}5$), about 8 miles southward of Punta Campo and about 3 miles offshore. Viewed from some positions, the central and largest rock, which is whitened by guano, assumes the appearance of a sail, the other two rocks, northward and southward of it, being of a darker colour; at other times, all three rocks are said to appear black, which may be accounted for by the absence of birds at certain seasons. The sea breaks violently against these rocks, and it is not known whether there is a safe navigable channel between them and the mainland.

Bahia de Bata.—Between Punta Bata, situated about 13 miles southward of Punta Campo, and Cabo Dos Puntas (Cape Two Points), situated about 27 miles further south-south-westward the coast recedes to form Bahia de Bata, into which rolls a heavy swell.

Punta Bata is a rounded point, low, wooded, and difficult of recog-

Chart 1361.

nition, with a reef extending about 1½ miles offshore, beyond which the water deepens suddenly. Landing is practicable under the lee of this reef.

Cabo Dos Puntas is also low and wooded, with a sandy beach, and is fringed with a sunken rocky reef which extends about 1½ miles offshore; the sea breaks on the whole of this reef, but more violently on its northern end. This point must always be given a good berth, particularly at night.

The depths along the shore of Bahia de Bata being very irregular, great caution is necessary; the bottom is generally mud, but in many places, especially in the southern part of the bay, there are patches of rock, and it is therefore necessary to ascertain the nature of the bottom before anchoring.

The shores of the bay are low and wooded, with a narrow, sandy beach which is interrupted by the mouths of several rivers.

The mouth of the northernmost river is situated about one mile southward of Punta Bata; the river is small but accessible to boats for a distance of about 12 miles up stream. *See* view facing page 113.

At about 4 miles southward is the mouth of Rio Mbia, and about the same distance still further south is the mouth of the Rio Otondo or Akondo. On its northern side is the trading village of Otondo, consisting of a few houses scattered along the bank.

There is a factory at the mouth of the river on its southern side.

The next river southward of Rio Otondo is known as Rio Olende, and Rio Ekuku is about 9 miles south-south-westward of Rio Otondo.

The entrance to Rio Ekuku is about three-quarters of a cable wide, and forms a good mark for vessels entering the bay from southward. The river has a bar at its mouth over which the depth is less than one foot (0^{m}3), but it has been ascended by boats for a distance of about 5 miles, above which it is not navigable. At the last of the outgoing tidal stream the water within the bar is fresh, but dark in colour and full of organic matter.

Anchorage.—In addition to the anchorage off Bata, *see* below, good anchorage may be obtained in Bahia de Bata, off the mouth of Rio Otondo in depths of from 4 to 6 fathoms (7^{m}3 to 11^{m}0), mud.

Chart 1361, plan of Bahia de Bata.

Bata.—**Light.**—This town which had a population in 1948 of 23,000 and, with a number of factories, is situated a little northward of the mouth of the Rio Ekuku; about 1½ miles further north-eastward is another settlement, Nueva Bata (*Lat. 1° 52′ N., Long. 9° 49′ E.*), situated in front of the Roman Catholic mission building, the great trees surrounding which are visible from afar. Viewed from about 6 miles seaward, the wooden boat pier, and the red road with stone steps leading inshore, stand out clearly against the green background. Government house, with its white roof, standing on high ground, is also conspicuous.

A light is exhibited, at an elevation of 37 feet (11^{m}3), on the Custom House at Punta Lundone, about 4 cables west-south-westward of Nueva Bata.

Landing is easily effected in ship's boats on the beach in front of the boathouse of the northernmost factory, which is somewhat sheltered by some rocks lying off it, but it is better to use a surf-boat.

Bata is connected by telephone with Benito.

Charts 594, 2202a, 2203, 2127.

Chart 1361, plan of Bahia de Bata.

There is occasional steamer communication with Europe.

The residence of the Sub-Governor of the district is at Nueva Bata.

The climate in July and August is pleasant, with refreshing sea breezes. The vicinity is healthy, there being little sickness amongst Europeans.

Anchorages.—Dangers.—The following anchorages may be obtained off Bata by vessels with local knowledge. The first, where the holding ground is fairly good but the swell is heavy, is in a depth of about 6½ fathoms (11^m9), sand, with the flagstaff at Bata bearing 165°. Patches of rock are reported to exist near this anchorage, and it is necessary to make sure of the nature of the bottom before coming to an anchor.

Another anchorage is in about 3½ fathoms (6^m9), 3½ cables from the coast, with the same flagstaff bearing 116°.

A more sheltered anchorage is off Neuva Bata, in about 4 fathoms (7^m3), 4½ cables from the shore, with the Roman Catholic mission building bearing 161°.

A shoal, over which the depth is about 2½ fathoms (4^m6), lies about 2 cables inshore of the first of the above anchorages, and about 4½ cables north-westward of the flagstaff at Bata.

A rocky spit extends for about 2½ cables westward of Punta Evidokue, which latter is situated about one mile north-eastward of the light-structure at Punta Lundone, and is inconspicuous. An obstruction, the position of which is doubtful, has been reported in a position about 8 cables west-north-westward of Punta Evidokue.

A 2-fathom (3^m7) shoal lies about 5 cables north-westward of the light-structure at Punta Lundone.

Vessels anchoring off Nueva Bata must be careful to avoid the above shoals.

Chart 1361, plan of Rio Benito.

Rio Benito.—The mouth of this river is situated at the head of a bay which is contained between Punta Mbode (Mbade), situated about 3 miles south-south-westward of Cabo Dos Puntas, and Punta Fromagers, about 3 miles further south-south-westward. There is a native village on Punta Mbode.

The coast is in many places fringed with rocks, making landing difficult, but there are some sandy beaches near Punta Mbode (*Lat. 1° 37′ N., Long. 9° 38′ E.*), especially in front of the old British mission, where landing can be effected.

The entrance to this river lies between Punta Indombo, near which is the large village of Indombo, and Punta Arena, three-quarters of a mile south-westward. Indombo village is not visible from seaward. A small pier is situated on the eastern side of Punta Arena, and another pier projects from Punta Negra (Black point), situated about 4 cables eastward.

The most prominent object on the northern side of the approach to the river is the American mission at Bolondo (Bofondo), which may be identified by its white pigeon-house. There is a hospital at the mission capable of accommodating between 20 and 30 patients.

The settlement is at Punta Arena, consisting of several houses and a steam sawmill.

There is occasional steamer communication with Europe.

There is a radio station at Benito, *see* page **44**.

Charts 594, 2202a, 2203, 2127.

Chart 1361, plan of Rio Benito.

Dangers.—Shoals, over which there are depths of about 3 feet ($0^{m}9$), and upon which the sea breaks heavily during the ebb tide, extend for a distance of about three-quarters of a mile off Punta Mbode.

A sandy spit, over which there are depths of from 2 to 6 feet ($0^{m}6$ to $1^{m}8$), extends about 1¾ miles in a north-westerly direction from Punta Arena, on which latter there is a factory and a large tree which can be seen at a considerable distance. Between the north-western extremity of the spit and the northern shore of the bay there are several shoal heads with depths of 5 and 6 feet ($1^{m}5$ and $1^{m}8$) over them.

Lights.—Lights are exhibited from cement columns 7 feet ($2^{m}1$) in height, on the heads of the piers at Punta Negra and Punta Arena.

Anchorage.—Good anchorage may be obtained off the mouth of the river, in a depth of about 4 fathoms ($7^{m}3$), mud, with Punta Arena (*Lat. 1° 35′ N., Long. 9° 38′ E.*), bearing 098°. There are also anchorages, in about the same depth, 1½ miles northward and one mile southward of this position.

Within the river, anchorage may be found abreast the factory, about one cable to 1½ cables from the shore, with the factory bearing 228°, in a depth of about 5 fathoms ($9^{m}1$); depths of from 3 to 4 fathoms ($5^{m}5$ to $7^{m}3$) will be found for a distance of about 1½ miles above this anchorage, which is sheltered from the swell, but the stream runs out at a rate which sometimes exceeds 3 knots.

Directions.—Tidal streams.—There are no pilots. On entering and leaving the river, soundings must be taken frequently and the position of the vessel checked by bearings to guard against the effect of the current. The resultant of the river current and the out-going tidal stream at times attains a rate of over 3 knots and, meeting the swell outside, causes the entrance to the river to appear as if barred by breakers. On the shoal banks at the entrance there is always a choppy sea. The best time to enter the river is a little before the slack water at high tide.

By keeping Punta Negra (Black point) and Punta Verde (Green point), both of which are situated on the northern bank of the river, in line bearing 124°, a straight course can be held into the river, but it will lead a vessel across the spit on the southern side of the entrance in depths of only 11 feet ($3^{m}4$) at high water, and the points are not always clearly distinguishable.

To carry depths of not less than 14 feet ($4^{m}3$) at high, and 9 feet ($2^{m}7$) at low water springs, a vessel should steer in with the mission station southward of Bolondo bearing 102°, and alter course to 110° so as to bring the Mission to bear 090° and the factory on Punta Arena 150°; from this position, she should steer 140° as far as the deep water in the mouth of the river.

Chart 1361, continuation of plan of Rio Benito.

River above Punta Arena.—Rio Benito is navigable for a distance of about 12 miles above its mouth, or to about one mile below the Yubi falls at Sendye. The current is swift and the holding ground poor. Vessels of not more than 6 feet ($1^{m}8$) draught, intending to ascend the river, should leave the anchorage at the mouth at about half-floodtide, so as to have sufficient water up to Punta Verde.

The French gunboat *Basilic* in 1891 ascended the river and anchored about 6 cables below the falls, which was as far as the strength of

Chart 1361, continuation of plan of Rio Benito.

the current would permit her to proceed. Of the two channels available, that which ran along the southern bank of the river had the greater depth.

Below the falls the river receives only two affluents worthy of notice, the Ombé and the Utonge, both of which are on the southern side. About half a mile above the mouth of the Ombé, and nearly a quarter of a mile below the village of Eloba, a ledge of drying rocks is marked by a red conical buoy, moored 50 feet (15^{m}2) westward of them; this buoy should be left about 50 to 60 feet (15^{m}2 to 18^{m}3) on the starboard hand when ascending the river.

The Ombé is only accessible to boats.

The Utonge has depths of from 9 to 13 feet (2^{m}7 to 4^{m}0) in it, and was ascended by the *Basilic* as far as the village of Meduma, where there is just swinging room for a small vessel.

Coast.—Southward of the mouth of Rio Benito (*Lat. 1° 35′ N., Long. 9° 38′ E.*) the land is low, undulating and wooded; along the coast, which is intersected by the mouths of several rivers, is a narrow sandy beach, fringed in many places with rocky shoals, some of which uncover; whilst inshore the land rises to a moderate elevation.

The mouth of the first of these rivers is situated about 6 miles south-westward of Punta Arena, and is fronted by reefs and rocks above water, which appear to render access to the river impossible.

Boqueah (Bokwa) village is situated close to the coast about 9 miles south-westward of Punta Arena; it is a trading village and like most of those along this coast is hidden in the forest.

Chart 1356.

The mouth of the second river is close to Punta Dione (Dioni), which is situated about 5 miles south-westward of Boqueah; breakers extend about one mile seaward of Punta Dione.

The third river, Rio Etembue, is situated about 8 miles north-eastward of Cabo San Juan, at the head of a bight which extends southward from the mouth of the second river remarked on above; in this bight there are several off-lying reefs.

There is a village on the northern bank at the mouths of each of these rivers, and timber is exported from this locality.

Northward of the second of the above rivers, there are depths of 5 and 6 fathoms (9^{m}1 and 11^{m}0) at a distance of 1½ miles offshore; but southward the same depths will be found 5 miles from the coast, but the whole of this area is imperfectly surveyed.

Off-lying dangers and banks.—Mitre bank, lying about 10 miles west-north-westward of Punta Dione, extends about 2 miles in an easterly and westerly direction. The depths over the bank are 16 and 17 fathoms (29^{m}3 and 31^{m}1), and there are depths of 38 fathoms (69^{m}5) close round it (*Lat. 1° 25′ N., Long. 9° 19′ E.*).

Dwarf shoal extends parallel with the coast, for almost 5 miles, from a position situated about 4 miles south-south-westward of Mitre bank. There is a depth of 5½ fathoms (10^{m}1) over it at its northern end; 6½ fathoms (11^{m}9) at its southern end; and deep water close round it.

A shoal, over which there is a depth of 11 feet (3^{m}3) lies about 5 miles south-westward of Punta Dione, and about 3 miles offshore.

Mumunein bank, a rocky shoal over which there is a depth of 2 fathoms (3^{m}7), lies about midway between the southern end of Dwarf shoal and a point on the coast situated about 6 miles north-north-

Chart 1356.

eastward of Cabo San Juan ; it extends about 2¾ miles in an easterly and westerly direction.

Mumunein rock lies upwards of 1½ miles offshore about 5 miles northward of Cabo San Juan. It is about one mile long in a northerly and southerly direction and has depths over it of from 4 to 16 feet ($1^{m}2$ to $4^{m}9$). There are depths of not less than 2 fathoms ($3^{m}7$) between the rock and the coast.

A rock, the exact position of which is not known, over which there is a depth of 9 feet ($2^{m}7$) and on which the s.s. *Manu* grounded in 1931, lies abreast the mouth of the Rio Etembue about 6 miles northward of Cabo San Juan, and about one mile eastward of the eastern end of Mumunein bank.

Islote Buenja is situated close to the coast about 3½ miles north-north-eastward of Cabo San Juan ; it is small in extent, generally appears green, and is surrounded by rocks, upon which the sea breaks heavily.

A shallow bank, said by the natives to be non-existent, is believed to extend in a north-westerly direction, for a distance of nearly 2½ miles from Islote Buenja. Over its north-western extremity, situated about 4 miles northward of Cabo San Juan, there is supposed to be a depth of 11 feet ($3^{m}4$), which H.M.S. *Espoir* touched in 1865.

In 1842 the ship *Diligent* struck a rock over which there was a depth of 8 feet ($2^{m}4$) ; the exact position of the danger was not ascertained, but it is assumed to be about 3 or 4 miles north-westward of Cabo San Juan. A rock, over which there is a depth of 7 feet ($2^{m}1$) is reported to lie about 4 miles 319° from Cabo San Juan, and it is probable that this is the rock upon which the *Diligent* struck.

Caution.—In view of the dangers described above, the recent discovery of several shoals in the approach to Bahia de Corisco, and the possibility of the existence of others which have not yet been discovered, vessels navigating in this vicinity, and approaching the bay from northward, should exercise great caution, being careful to sound frequently and to preserve an offing of at least 6 miles until about to make the entrance to the bay. This distance, however, will not take a vessel outside the Dwarf shoal, which should also be avoided.

Cabo San Juan.—Light.—This headland is covered with trees, and when seen from a northerly direction appears as three distinct heads, rather high and easy of recognition ; at the base of the cape, which is rocky and without a beach, the sea breaks violently for a distance of 2 cables offshore. A rocky bank extends for a distance of about 2¾ miles westward of the cape, with depths of from 6 to 10 fathoms ($11^{m}0$ to $18^{m}3$) over it ; westward of this bank the depths increase suddenly to 20 and 23 fathoms ($36^{m}6$ and $42^{m}1$).

A light (*Lat. 1° 10′ N., Long. 9° 21′ E.*) is exhibited, at an elevation of 78 feet ($23^{m}8$), from a white framework tower, situated on Cabo San Juan.

The Spanish Catholic mission, a large white house, is situated about 2 miles north-eastward of Cabo San Juan at a height of about 30 feet ($9^{m}1$), and forms a good landmark.

The shores in the vicinity of the cape are very low, but often when approaching from westward, the large trees have the appearance of hillocks, whilst the trunks assume a greyish tint and appear elongated ; this distortion, which is caused by strong mirage, gives to the coast the

Charts 1361, 594, 2202a, 2203, 2127.

Chart 1356.

appearance of cliffs, intersected where the trunks are hidden by foliage, by broad fissures or ravines. This illusion is of frequent occurrence on this part of the coast, but it is dispelled on closing the land.

The vicinity of Cabo San Juan, and the coast southward as far as Punta Mosquitos, is very dangerous, there are no conspicuous objects, and in the dry season the seas are high.

The streams near Cabo San Juan are complicated. The current setting north-north-eastward along the coast is influenced by the tidal streams in and out of Bahia de Corisco. *See* page 142.

BAHIA DE CORISCO.—This bay is entered between Cabo San Juan and Cap Esteiras, situated at a distance of about 33 miles southward.

The name Corisco, derived from the Portuguese, was conferred upon this bay on account of the frequent thunderstorms which are experienced in this locality.

In the centre of the bay, and on a line joining its extreme points, is Isla de Corisco, situated at the extremity of a series of shoals which extend in a north-north-westerly direction from the southern shore of the bay.

Northern side.—Cabo San Juan to Punta Dieque.—From Cabo San Juan (*Lat. 1° 10′ N., Long. 9° 21′ E.*) the coast trends in a south-south-easterly direction for about 4½ miles to Punta Corona, and forms two shallow bights separated by Punta Negra, a rocky point having the same characteristics as Cabo San Juan. The shore of the northern bight is fringed with rocks, which also extend for a quarter of a mile offshore from Punta Negra, but the southern bight has a sandy beach.

Punta Mosquitos is situated about 1½ miles east-south-eastward of Punta Corona, and is similar to the preceding points, but is even more rocky ; there are detached clumps of trees on the point, which, with the bay westward of it, is fringed with rocks. Shoal water extends for about three-quarters of a mile seaward from the shores of these bights on either side of Punta Corona.

From Punta Mosquitos, near which is the village of Calatrava, the coast between that point and Punta Dieque, about 11½ miles south-eastward, forms a shallow bight, in which a shelf with depths of less than 3 fathoms ($5^{m}5$) over it, extends as much as 4½ miles offshore in places. Punta Dambe, Punta Bitimbe, Punta Belekeke, and Punta Betika are situated, respectively 1¾, 2¾, 4 and 5¾ miles east-north-eastward of Punta Mosquitos. Rio Odingue enters the bay close eastward of Punta Betika.

Punta Eboko is situated about 1¾ miles eastward of Punta Betika, and thence the coast trends south-south-eastward for about 7 miles to Punta Dieque ; the rivers Embina, Epulo and Duia discharge into the bight in this stretch of coast.

The shore of this bight is slightly elevated, and on it stand several villages, the chief of which is Eboko.

Eastern side.—Punta Coco Beach to Crique Massotié.—Beacons.—Rio Muni is entered between Punta Dieque and Pointe Coco Beach, situated about 1½ miles southward, *see* page 143.

Pointe Elobey (*Lat. 0° 57′ N., Long. 9° 34′ E.*), is fringed with

Charts 1361, 594, 2202a, 2203, 2127.

rocks and is situated about 3½ miles south-south-westward of Pointe Coco Beach.

Pointe N'Dombo, on which there is a beacon, lies about one mile southward of Pointe Elobey, and near it is the village of N'Dombo which is visible from seaward.

From Pointe Elobey, the shore trends for about 15 miles in a south-south-easterly direction to the mouth of Crique Massotié at the entrance to Baie de Mondah (Munda), *see* page 146 ; the whole of this coast is wooded and is intersected by the mouths of numerous small streams, it is also fringed with shoal water, which extends seaward for a distance of 3½ miles at some places.

Récif Buyumba, on which the sea breaks, extends nearly 1½ miles in a south-westerly direction from a point of the same name, situated about 7 miles southward of Pointe Elobey. There is another patch, which breaks and is marked by a beacon, lying about 1½ miles west-south-westward of Pointe Madekele, which is situated about 3 miles south-south-eastward of Pointe Buyumba. At a short distance northward of Pointe Madekele there is a village.

The southern summit of Monts N'Kéba, 689 feet ($210^{m}0$) high and situated about 5 miles eastward of Pointe Buyumba, is marked by a conspicuous round tree.

Southern side.—Pointe Acanda to Cap Esteiras.—Pointe Acanda (Akanda), situated about 7 miles west-south-westward of the mouth of Crique Massotié, is the western entrance point of Baie de Mondah, and thence the southern shore of Bahia de Corisco trends in a west-south-westerly direction for about 11 miles to Cap Esteiras, *see* page 149.

Pointe Moka is situated about 2½ miles west-south-westward of Pointe Acanda, and the village of Moka is about 1½ miles further south-westward. Moka is situated at the mouth of Crique Boulokouboué, which appears to connect with Crique Tsini ; *see* page 147.

Pointe Boulokouboué is a well-defined rocky point situated about 3½ miles westward of Pointe Moka ; the village of Ebelée is about one mile south-westward, and Pointe Ydolo is a further 3 miles west-south-westward.

Cap Esteiras (*Lat. 0° 37′ N., Long. 9° 20′ E.*) is situated about one mile westward of Pointe Ydolo, *see* page 149.

An extensive shoal area, with depths of less than 3 fathoms ($5^{m}5$) over it, extends off the southern shore for about 2½ miles northward from Cap Esteiras, for about 7¾ miles northward from Pointe Boulokouboué and for about 4 miles northward from Pointe Acanda. This latter is known as Banc Acanda, *see* page 147.

Shoals in the entrance to Bahia de Corisco.—Banco Lauria, a rock over which there is a depth of 11 feet ($3^{m}4$), lies about 7 miles west-south-westward of Punta Corona.

Nearly 1½ miles north-north-eastward of the rock there is a patch over which the depth is 15 feet ($4^{m}6$), stones, and three-quarters of a mile north-westward of this patch there are depths of less than 5 fathoms ($9^{m}1$). About 2¼ miles north-north-eastward of Banco Lauria, there is a 15-foot ($4^{m}6$) patch, the existence of which is doubtful.

Piedra Ugoti lies about one mile westward of Punta Corona ; it is a small detached rock, which dries, and is marked by breakers at high water if there is the least sea running. The bottom is very foul

Chart 1356.

between this rock and the point, and vessels should not attempt to pass between them. There is a depth of 9 feet (2m7), sand, at about 6 cables north-eastward of this rock.

Bajo Ca Kulle is a 16-foot (4m9) patch, and lies about 9 cables south-eastward of Piedra Ugoti.

Biguma, a rock awash at low water, lies near the edge of the shoal water fronting the bay between Punta Corona and Punta Mosquitos.

Buoy.—Black conical whistle-buoy No. 1 surmounted by a ball is moored about one mile south-south-westward of Piedra Ugoti, and about the same distance westward of Bajo Ca Kulle. This buoy should not be depended upon.

Isla de Corisco.—Light.—This island is a Spanish possession, and is administered by the Sub-Governor at Kogo (*Lat. 1° 05′ N., Long. 9° 42′ E.*), and *see* pages 4 and 145. It is moderately high and is remarkable for the luxuriance of its diversified scenery, consisting of hills, forests, prairies, and lakes, etc., all of which are necessarily on a diminutive scale. The climate of the island is considered unhealthy, but it is healthier than that of the neighbouring coast. The population is gradually decreasing, and the latest statistics record barely 1,000 inhabitants, of whom only 15 were Europeans; the natives are scattered all over the island, and are considered to be the most intelligent of the natives of Spanish Guinea; they belong to the Benga tribe, and their principal village is near the centre of the southern coast.

The island is completely surrounded by a shoal, extending in some places for a distance of 2½ miles offshore.

A rocky patch, which is awash, is situated about 1½ miles north-north-eastward of Punta Italo, the north-eastern point of the island; it lies on a bank with depths of 5 fathoms (9m1) or less over it, extending about 3 miles north-north-eastward from Punta Italo. Between this patch and the point there is another patch, with a depth of 2 feet (0m6) over it.

Banco Nengueamegue dries in places, and extends about 2¼ miles eastward of Punta Yoko (*Lat. 0° 53′ N., Long. 9° 22′ E.*), the south-eastern point of the island. Shoal water also extends about 2½ miles in a south-easterly direction from Punta Yoko, and about 2¼ miles from the southern coast of the island.

Punta Uguni, the south-western point of Isla de Corisco, is rocky and bare; the trees on the southern coast of the island are thinly scattered as compared with those on the northern and eastern coasts. A detached shoal over which there are depths of 2½ fathoms (4m6) and with a least depth of 13 feet (4m0) extends about 1¾ miles south-westward from a position about one mile west-south-westward of Punta Uguni.

The western coast of Isla de Corisco is rocky; these rocks, especially on their southern sides, are covered with patches of white which can be seen at a distance. The effect of mirage on the trees which line the coast is similar to that in the vicinity of Cabo San Juan, *see* page 138.

Punta Gueliba is the north-western point of the island; a shoal spit with depths of from 9 to 14 feet (2m7 to 4m3) over it extends about 1½ miles north-westward from the point.

A light is exhibited, at an elevation of 92 feet (28m0) from the northern end of Isla de Corisco.

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Islote Leva is uninhabited, and is situated on the shoal surrounding Isla de Corisco, about one mile west-south-westward of Punta Ugomi, the southernmost point of that island. It is of moderate height, covered with trees, and surrounded by breakers, especially on its northern and eastern sides; on the latter side they extend half a mile offshore. There is no passage northward of Islote Leva except for canoes.

The shoal which surrounds Isla de Corisco extends about half a mile westward of, and over 2 miles southward of, Islote Leva; also a reef, on which the sea breaks heavily even in ordinary weather, extends about 1½ miles southward of the latter islet.

The northern and western coasts of Isla de Corisco should not be approached within a distance of 2½ miles, or a depth of 7 fathoms ($12^{m}8$), and on its north-eastern side an offing of 4 miles, or a depth of 13 fathoms ($23^{m}8$) should be preserved, in order to clear the banks extending from the island. The passages southward of the island should only be used by those possessing local knowledge.

Banco Laval, Banco Bañe, and Bancos del Este.—Banco Laval is a dangerous bank extending about 3 miles south-south-eastward and 2¼ miles eastward from a position about 2½ miles south-south-westward of Islote Leva; it presents, on its western side, a long line of breakers and sunken rocks. There is a narrow passage between this bank and the shoal extending southward of Isla de Corisco, and also a passage between it and the north-western side of Banco Bañe, but neither of these passes should be used, and the locality should be avoided.

Banco Bañe, over which the depths are everywhere less than 3 fathoms ($5^{m}5$), extends nearly 10 miles in a north-easterly and south-westerly direction, and the northern end of its north-western edge lies about 3½ miles south-eastward of Punta Yoko.

Islote Conga (*Lat. 0° 48′ N., Long. 9° 23′ E.*) is a rock lying almost in the centre of Banco Bañe, with another above-water rock half a mile south-westward of it.

Isla Bañe is low, but it is conspicuous as it is covered with high trees, and is situated about one mile north-eastward of Islote Conga. Eastward of Banco Bañe, drying sands, known as Bancos del Este, extend nearly 2 miles, almost to the edge of Banco Bañe.

Banco Parisot, over which there is a depth of 5 feet ($1^{m}5$), is a small isolated head lying about 1¾ miles south-south-eastward of Islote Conga, and near the south-eastern edge of Banco Bañe.

Although the distance between Banco Bañe and the southern shore of Bahia de Corisco is from 7 to 9 miles, the only available passage is along the south-eastern side of this bank. Apparently a depth of 3½ fathoms ($6^{m}4$) might be carried through this passage, but, as no leading marks are available, and as, in 1920, it was reported to have shoaled, it should only be used by those possessing local knowledge, *see* page 140.

Caution.—Too much dependence should not be placed on the chart, as the sandbanks may shift from time to time.

Currents.—Tidal streams.—The current and tidal streams often attain a rate of from one to 2 knots between the banks which encumber Bahia de Corisco, their directions varying in accordance with the state of the tide. Seaward of Isla de Corisco, the current generally

Charts 1361, 594, 2202a, 2203, 2127.

Chart 1356.

runs in a north-north-easterly direction at a rate of less than one knot; in the bay the tidal stream flows eastward on the rising tide and westward on the falling tide.

In the southern part of the bay the out-going (westerly) stream sometimes exceeds 3 knots in the rainy season: in the dry season it does not normally exceed 2 knots.

Islas Elobey.—Light.—A shoal spit, over which the depths are less than 3 fathoms ($5^{m}5$), extends about 8 miles in a north-westerly direction from the coast between Pointe Coco Beach and Pointe N'Dombo. On this spit are Islas Elobey Grande and Elobey Chico, together with a number of islets, rocks, and shoal patches. Near its north-western extremity are Bancos de Elobey, over which the depths are less than 2 fathoms ($3^{m}7$).

There are depths of from 5 to 6 fathoms ($9^{m}1$ to $11^{m}0$), with 9 fathoms ($16^{m}5$) around, about 3½ miles westward of Isla Elobey Grande.

These islands belong to Spain, *see* page 4.

Elobey Grande is about 1½ miles in length, in a northerly and southerly direction; close off its northern point is situated Islote Belovi (*Lat. 1° 00′ N., Long. 9° 31′ E.*). Punta Belovi is situated about three-quarters of a mile south-south-eastward of Islote Belovi, with Punta Masaka, the south-eastern point of the island, three-quarters of a mile further south-south-eastward. Punta Idokogo is the south-western point of the island and Punta Elatande is the westernmost point of the island. The coast line is formed of small, steep cliffs about 33 to 40 feet ($10^{m}0$ to $12^{m}2$) in height. It is wooded, and inhabited by Benga fishermen.

Bancos de Bene, which include some rocks awash, lie about one mile eastward of Isla Elobey Grande.

Isla Elobey Chico, which is about half a mile in length, and completely flat, is situated about one mile north-eastward of Isla Elobey Grande.

A light is exhibited, at an elevation of 13 feet ($4^{m}0$), from a red tower on the northern point of Isla Elobey Chico. Coconut palms and fruit trees are cultivated, and in 1950, it was reported that about 20 Europeans and 100 natives lived on Isla Elobey Chico.

Anchorages.—Between Isla de Corisco and Islas Elobey, at a moderate distance from the shore of either, anchorage can be found in depths varying from 9 to 12 fathoms ($16^{m}5$ to $21^{m}9$).

Good anchorage will be found in a depth of about 4½ fathoms ($8^{m}2$), mud, with Punta Italo (*Lat. 0° 55′ N., Long. 9° 21′ E.*), bearing about 292°, and Punta Yoko about 223°; in this position a vessel will be well sheltered from south-westerly winds, and the holding ground is so tenacious that the Tornadoes from eastward need not be feared.

Though the water is usually quite smooth at this anchorage, without any surf on the beach, it occasionally happens that a swell sets in without any apparent cause, when rollers will break on all sides of Isla de Corisco.

Anchorage may also be obtained southward of Banco Nengueamegue, in the bight in the shoal which extends from Isla de Corisco. At low water the drying portions of the bank afford a guide for anchoring.

There is fair shelter for vessels inside Bancos de Elobey, about 1¼ miles north-eastward of Isla Elobey Chico, in depths of from 4 to 5 fathoms ($7^{m}3$ to $9^{m}1$), mud.

Charts 1361, 594, 2202a, 2203, 2127.

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At N Dombo, small vessels anchor half a mile offshore, with the custom-house flagstaff bearing 030°, in a depth of 10 feet ($3^{m}0$), mud and good holding ground.

Rio Muni.—Pilotage.—This river is approached between the coastal bank extending off the northern shore of Bahia de Corisco, and the Bancos de Elobey. It enters the bay between Punta Dieque and Pointe Coco Beach, both of which are low and wooded and fronted by rocks; it is navigable by large vessels as far as Isla Gande situated about 9 miles above the entrance.

The least depth in the channel of approach is about 23 feet ($7^{m}0$). Pilots can be obtained by making the usual signal.

The Bengas of Cap Esteiras are nearly all good pilots, both for the coast and for the rivers flowing into Bahia de Corisco, and they are always ready to offer their services to vessels arriving off their villages. Although they know the coast well, however, too much confidence should not be placed in them, as they are not so well acquainted with the depths and nature of the bottom off it.

Shoal.—In 1932, the Spanish s.s. *Legazpi*, drawing 18 feet ($5^{m}5$), reported grounding in the channel off Bancos de Elobey, about 2¼ miles north-westward of Elobey Chico light tower (*Lat. 1° 00′ N., Long. 9° 32′ E.*).

It was reported, in 1938, that Bancos de Elobey were extending northward, and the depths in the channel were less than shown on the chart.

Buoyage.—A conical light-buoy, painted red, exhibiting a *red flashing* light *every three seconds* is moored about 5 miles north-westward of Elobey Chico light.

A conical light-buoy, painted black, exhibiting a *green flashing* light *every three seconds*, is moored about 1½ miles north-eastward of Elobey Chico light.

A conical light-buoy, painted red, exhibiting a *red flashing* light *every five seconds*, is moored about 4 cables southward of Punta Dieque.

A black conical buoy, No. 6, surmounted by a ball, is moored on the northern side of the river, about 1¾ miles east-north-eastward of Punta Dieque.

A black conical buoy, No. 7, surmounted by a ball, is moored on the northern side of the river, about 3¾ miles east-north-eastward of Punta Dieque.

Directions.—To enter the river, a vessel should pass southward of the first of the aforesaid light-buoys, close northward of the second light-buoy, and then close southward of the light-buoy off Punta Dieque.

The buoys are not to be depended upon, and, should they not be in position, a pilot should be obtained.

As it is reported that the banks in the approaches to the river are liable to change, caution should be observed.

In December, 1932, H.M.S. *Delphinium* visited Rio Muni and experienced no difficulty in following the channel, the charted depths in the river and its approaches appeared accurate. In the channel between Pointe Uvinia and Isla Gande, *see* above, a least depth of 18 feet ($5^{m}5$) was obtained.

Chart 1356, plan of Ukoko.

Settlements. — Anchorage. — Buoys. — Anchorage may be

Chart 1356, plan of Ukoko.

obtained in a depth of 10 fathoms ($18^{m}3$), north-westward of Pointe Coco Beach (*Lat. 1° 00′ N., Long. 9° 36′ E.*), near which is Ukoko, where there is a French Government station. The Administrator's house, with a flagstaff in front, is a conspicuous building near Pointe Coco Beach.

Two small red buoys are moored about three-quarters of a cable westward, and 4 cables west-south-westward, respectively, from Pointe Coco Beach.

Coco Beach custom-house and post office are situated about 3 cables north-eastward of the station, near the village of Douma.

Chart 1356.

Boutica, a French settlement with a few native huts, is situated on Pointe Uvinia, about 6 miles north-eastward of Pointe Coco Beach. Westward of the point the anchorage and landing are exposed, but eastward of it the anchorage, in a depth of 7 fathoms ($12^{m}8$), mud, and the landing are both good. Off the point the river contracts in width and the out-going stream is strong, sometimes attaining a rate of 4 to 4½ knots.

Lights.—Leading lights are established on the eastern side of the entrance to Rio Kongue. The front light is exhibited, at an elevation of 13 feet ($4^{m}0$), from a red square tower, 13 feet ($4^{m}0$) in height, on Isla Ivelo, and the rear light at an elevation of 104 feet ($31^{m}7$), from a red tower, 41 feet ($12^{m}5$) in height, on the northern bank of Rio Muni. These lights in line, bearing about 059°, lead up Rio Muni.

Rio Muni above Boutica.—A shoal, about half a mile in extent, over which there is a depth of 2½ fathoms, lies about one mile north-eastward of Pointe Uvinia; half a mile further, in the same direction and on the eastern side of the mouth of the Rio Kongue, is Isla Ivelo.

It is reported that vessels drawing 26 feet ($7^{m}9$) usually anchor in the mouth of the Rio Kongue abreast Kogo, about 2½ cables offshore. The tidal stream is said to attain a rate of 3-4 knots at this anchorage.

The settlement of Kogo (*Lat. 1° 05′ N., Long. 9° 42′ E.*), which is situated on the northern side of Rio Muni, eastward of the mouth of Rio Kongue, is the headquarters of the administration for the Spanish district of Elobey, *see* page 4, and has a population of about 20 Europeans and 200 natives. The hospital, which can accommodate four Europeans, is situated on the summit of the hill on which the town is built, and is very prominent from the west. The district is reported to be fairly healthy. Imports are few, and timber is practically the only export. No supplies are available.

There is occasional steamer communication with Europe.

Chart 1361.

Isla Gande, above which there are two wooded islets, is situated on the northern shore of the main channel, about 4¼ miles above Pointe Uvinia; south-eastward of this island, and on the southern side of the channel, lie the two Islas Evongue, separated by a creek which is available for vessels drawing less than 6½ feet ($2^{m}0$).

The neighbourhood of Rio Muni and its tributaries is inhabited by Pahouins and Balusekyamis, and that of the Kongue by Balengis. The chief products are ebony, rubber, and dye woods.

Tributaries to Rio Muni.—Rio Muni receives from the Spanish or northern side, the waters of the Kongue and the Uttongo with its tributaries the Ibun and Totche. On the French or southern side, its

Charts 1361, 594, 2202a, 2203, 2127.

Chart 1361.

affluents are the Bañe, which is in Spanish territory; while the others, all in French territory, are the Tembony, with its tributary the Nonddé, the Noyo, and the Mévobé.

Rivière Mévobé enters Rio Muni by several mouths between Pointe Ocoya and Pointe Uvinia, *see* chart 1356.

Rio Kongue joins the Muni almost opposite Pointe Uvinia (*Lat. 1° 03′ N., Long. 9° 41′ E.*); it is about one mile wide at its mouth, with depths of from 2 to 2¾ fathoms ($3^{m}7$ to $5^{m}0$). The village of Kogo, *see* page 145, and a conspicuous factory are situated on the eastern side of the mouth of this river. About 4 miles upstream, the river contracts at its confluence with the Mangiani; and off the village of Mianda, about 4 miles further upstream, where the water is still brackish even at low water, the depths are not more than from 4 to 5 feet ($1^{m}2$ to $1^{m}5$).

Rio Uttongo has a number of rocks on the southern side of its approach, but they are well known to the natives and are easily visible. At about 3 miles above its entrance is Isla Bakalekeke, which is surrounded by a large bank of sand and mud leaving only a very narrow channel. The villages of M'Bola and Mayembie are situated on the northern and southern banks, respectively, opposite the island. Above this point the river divides into three branches; Rio Ibun, deep and clear, is about 6 or 7 miles in length and its shores are sparsely inhabited; the Totche is much shorter but its banks are inhabited, and it can be ascended by steam boats as far as Mikango; and the upper Uttongo, in which there are several rocks which must be avoided, and which is completely barred across at Indombé (*Lat. 1° 15′ N., Long. 9° 55′ E.*).

Rio Bañe enters the estuary on the eastern side of the larger Isla Evongue; it appears to carry a least depth of about 3½ feet ($1^{m}1$) as far as the village of Djogobouro, about 9 miles from its mouth.

Rio Tembony, the principal affluent of Rio Muni, is entered by the narrow channel between the Islas Evongue; the river is narrow, but it can be ascended by vessels drawing up to 6½ feet ($2^{m}0$) as far as the village of Ekododo, where there is a French factory, abreast which there is a depth of 10 feet ($3^{m}0$), but the holding ground is poor. Above M'beto, situated about half-way up to Ekododo, the water in the river is fresh, but muddy; above Ekododo the river narrows, the current is swift, and navigation is impeded by snags.

Rivière Nonddé, a tributary to Rio Tembony, is only navigable by boats, and it also is encumbered by snags.

Rivière Noyo has a bar at its mouth on which stands the island of Tabalon. The channel, which is on the eastern side of the island, is narrow and only suitable for vessels drawing up to 6 feet ($1^{m}8$); 3 or 4 miles upstream navigation becomes very difficult. A small French vessel has ascended as far as Issomé, about 28 miles upstream.

Chart 1356.

Baie de Mondah.—This bay occupies the south-eastern corner of Bahia de Corisco; navigation in it is rendered difficult by numerous banks and rocks. In addition to the shoals and the mud banks which extend from the shores of the bay, a drying bank of soft mud lies at the head of the bay, and from it two long, narrow spits extend in a northerly to north-westerly direction, dividing the bay into three narrow channels.

Chart 1356.

Banc Marabout is the north-eastern of the spits referred to above, and is a narrow bank over which the least depth, in a position about 3½ miles north-westward of the mouth of Crique Massotié, is 4 feet (1^{m}2); within depths of 3 fathoms (5^{m}5), the bank extends from the above position in a north-westerly direction for about 5 miles, and in a southerly direction to the head of the bay where it joins Banc de l'Ouest.

Banc de l'Ouest extends northward from Île Busimba, which is situated at the head of the bay; after running parallel to, and about 1½ miles off, the western shore of the bay for about 8 miles, it curves north-westward round the edge of Banc Acanda, which latter extends north-westward from the point of that name (*Lat. 0° 40′ N., Long. 9° 30′ E.*), leaving only a narrow passage between the two.

Banc de l'Ouest dries in one place, but has depths over the rest of it from 3 to 10 feet (0^{m}9 to 3^{m}0).

Pointe Acanda (*Lat. 0° 40′ N., Long. 9° 30′ E.*), is a rounded point about 1½ miles southward of which is Mont Acanda. A mud flat, which almost dries, extends offshore from half a mile to one mile in the vicinity of the point.

The main channel into the bay lies between Banc Marabout and Banc de l'Ouest; the channel eastward of Banc Marabout is impracticable.

Buoyage.—A red conical buoy, " A," surmounted by a cylinder, situated about 7 miles northward of Pointe Acanda, marks the northern extremity of Banc Marabout.

A red conical buoy " B," surmounted by a cylinder, situated on the eastern side of the channel, about 4 miles north-eastward of Pointe Acanda, marks the western edge of Banc Marabout.

A black spar buoy situated about 3¼ miles north-eastward of Pointe Acanda marks the north-eastern edge of Banc Acanda.

A can buoy " C," painted red and white horizontal stripes, situated about 4½ miles east-south-eastward of Pointe Acanda, marks the anchorage of Baie de Mondah.

A black conical buoy " D," is situated about 1¾ miles south-south-westward of Mont Mondah and on the eastern side of the channel leading to the anchorage off Kendje, and marks a small 2-fathom (3^{m}7) patch. A red can buoy, surmounted by a cylindrical topmark, is moored about 11 cables south-south-westward of Mont Mondah, near the entrance to Crique M'Bafane.

A small white can buoy is moored about 1¼ miles northward of Ile Assimba, and a black spar buoy about 9 cables north-westward of Ile Assimba, to mark the channel between the anchorages of Baie de Mondah and that off Île Mondah.

Rivière Mondah and Crique Tsini.—Tidal streams.—Rivière Mondah, with its tributaries the rivers Abamo, Kobi, Djemboé, and Ebé, flows into the head of Baie de Mondah on the western side of Pointe Kendje, off which anchorage may be found in a depth of 5½ fathoms (10^{m}1). This anchorage is approached by crossing the bar formed by the southern end of Banc Marabout, after which a least depth of 3¾ fathoms (6^{m}9) may be carried to the anchorage. Off Kendje the streams have a rate of 3½ to 4 knots at springs during the dry season.

Crique Tsini.—This creek extends almost to Kringer on the

Charts 594, 2202a, 2203, 2127.

Chart 1356.

northern bank of Rivière Gabon ; it is very narrow, and its steep banks are low, wooded, and densely populated. The creek is approached by crossing the southern end of Banc de l'Ouest.

Iles Mondah are three wooded islets at the mouth of Crique Tsini, about 5 miles south-south-eastward of Pointe Acanda. On Mondah, the largest of the three, there is a village, a French forestry establishment, and a former custom-house ; this latter was originally established on Assimba, the northernmost of the three islets, where a house is still visible (*Lat. 0° 36′ N., Long. 9° 33′ E.*)

Charts 594, 2202a, 2203, 2127.

CHAPTER IV

CAP ESTEIRAS TO RIVIÈRE MASSABI

CLIMATE AND WEATHER.—*See* page 55.

Chart 1356.

CAP ESTEIRAS TO CAP SANTA CLARA.—Coast.—Cap Esteiras (*Lat. 0° 37′ N., Long. 9° 20′ E.*) is low and rocky; from a little distance westward, Cap Esteiras shows as a decided point, but from the offing it is not so prominent, the first land sighted being that in the vicinity of Pointe Mégombié, situated about 2 miles south-westward of it. Pointe Mégombié does not, however, become apparent until the prominent edge of Cap Santa Clara is identified. A rocky shelf, on which the sea breaks very heavily, extends from the cape in a northerly direction for about half a mile, whilst further out in the same direction, and about 2½ miles offshore, are depths of 3 fathoms ($5^{m}5$), on the north-western edge of the bank which extends from the southern shore of Bahia de Corisco.

The depths off the cape are irregular; a detached shoal, on which the least depth is 3½ fathoms ($6^{m}4$), extends from about 4½ miles west-north-westward to 6 miles north-westward of the cape; there is also a 2½ fathom ($4^{m}6$) patch about 2 miles north-westward of the cape.

Near the cape are some villages, the most important of which is Sahoué; these latter are hardly discernible from seaward, but the inhabitants frequently offer their services as pilots, *see* page 144.

At night, winds from the offing make anchorage off Cap Esteiras undesirable.

Current.—The current seaward of the cape sets generally northward at a rate of three-quarters of a knot, but is influenced by the tidal streams. At springs the streams are sometimes strong enough to cause a weak resultant flow to the southward for an hour or two.

Coast.—Pointe Mégombié is well wooded and comparatively high; close northward of it at Averoma, there is a mission station.

From Pointe Mégombié, the coast trends southward for about 5¼ miles to Cap Santa Clara, situated on the northern side of the entrance to Rivière Gabon; it is bordered by rocks on which the sea breaks heavily in bad weather. The whole of this stretch of coast appears as an unbroken line of level trees; it is formed by a succession of cliffs, about 65 feet ($19^{m}8$) high and capped by trees, alternating with the mouths of numerous streams which only flow during the rainy

Charts 1361, 594, 2202a, 2203, 2127.

Chart 1356.

season, lasting from the middle of November to the middle of July. At the foot of the cliffs is a sandy beach, which, during the dry season, is continuous and closes the mouths of these rivers.

Chart 1877.

Pointe Caléga and Pointe Ediongoué are hardly distinguishable, and are only indicated by large rocks and rugged cliffs of a yellowish colour.

Depths of less than 3 fathoms ($5^{m}5$) will be found in places at a distance of about one mile from this part of the coast.

Pointe Mombaliquito, also known as Le Faux Cap, is situated about one mile north-westward of Cap Santa Clara, and is a slight projection, 1¼ miles westward and 1½ miles southward of which depths of less than 3 fathoms ($5^{m}5$) will be found at 1½ miles offshore, but it is not so easily distinguished as Pointe Ouquouëa.

Pointe Ouquouëa is situated about midway between Pointe Mombaliquito and Cap Santa Clara; the point is very high and is covered with tall trees, some of which being denuded of foliage are very remarkable; on either side of the point are sandy beaches, and at the point near the mouth of a stream of the same name close southward of it are some low cliffs. Northward of Pointe Ouquouëa, near a remarkable rocky point named Mabendia, is a village surrounded by plantations.

Between Pointe Mombaliquito and Cap Santa Clara (*Lat. 0° 30′ N., Long. 9° 19′ E.*), a great number of detached rocks, on which the sea breaks heavily, lie on a shoal bank which extends about 1½ miles south-westward of Pointe Ouquouëa, and nearly one mile southward of Cap Santa Clara.

RIVIÈRE GABON.—General remarks.—The native name of this river is M'Pongo; its tributaries rise in the mountains in the vicinity of the south-eastern corner of Spanish Guinea. The Gabon may be more properly termed an estuary than a river, it is accessible to vessels of deep draught, and affords a commodious anchorage with good shelter for a large number of vessels. The numerous and extensive shoals which obstruct its entrance render navigation somewhat difficult. The least depth in the entrance channel is 6 fathoms ($11^{m}0$).

The estuary is entered between Cap Santa Clara and Pointe Pongara, situated about 9 miles southward, and its banks are covered with rich vegetation and intersected by the mouths of numerous creeks.

The general direction of the estuary, from its mouth upstream, is south-eastward for about 16 miles and thence east-south-eastward for about 19 miles to Pointe Pungue, a promontory at the head of the estuary, which separates the mouth of Rivière Ramboë, the two large tributaries to the Gabon.

Pilotage.—There are no pilots for the entrance to the Gabon, but natives may be procured from Cap Esteiras who are generally acquainted with the channels, *see* page 149. In 1947, a Frenchman, known locally as the Libreville pilot, was available and on request would meet a vessel off Thémis bank, but he was not qualified to take over charge of the ship.

Entrance.—Beacons.—Caution.—Cap Santa Clara, the northern entrance point, is a good mark. A white conical beacon, 16 feet ($4^{m}9$) in height, on the extremity of the cape, is prominent. A line of breakers fringes the cape in fine weather at a distance of half a mile from it,

Charts 1361, 594, 2202a, 2203, 2127.

Chart 1877.

and in bad weather at over one mile from the coast, but depths of less than 3 fathoms ($5^{m}5$) extend nearly 2 miles in a south-westerly direction, within which distance it is not prudent to approach.

Pointe Pongara (*Lat. 0° 21′ N., Long. 9° 21′ E.*), the southern entrance point, is the northern extremity of a low peninsula composed of alluvial deposits which the action of the sea has covered with sand; it is sterile, except for the tufts of grass with which it is covered. The point is being eroded by the action of the currents and tidal streams, and is now of a different shape from that shown on the charts. Great care must therefore be used when fixing the ship by bearings of the land in this vicinity.

A white beacon with a black top stands about 4½ cables south-south-eastward of the extremity of Pointe Pongara; the beacon should not be confused with a taller wooden tower which also stands on the point.

Pointe Gombé situated about 4½ miles south-westward of Pointe Pongara, is a good landmark, it is about 148 feet ($45^{m}1$) high, has some reddish patches on it, and distinctive trees on its landward side. The holding ground off it is good, but off Pointe Wingombé, 1¼ miles north-north-eastward, a depth of 2¼ fathoms ($4^{m}1$) will be found at a distance of about one mile in a north-westerly direction.

Light.—A light is exhibited, at an elevation of 187 feet ($57^{m}0$), from an iron column, about 39 feet in height, painted white and black, situated on the summit of Pointe Gombé.

Aspect.—The eastern side of the estuary, for about 20 miles upstream from Cap Santa Clara, is high and dominated by hills of calcareous formation, but it is not easy to distinguish the various summits. Of these, Mont Bouet, 328 feet ($100^{m}0$) high, is the most easily identified when approaching from seaward; it is wooded and is situated about 2½ miles inland, and 9½ miles south-eastward from Cap Santa Clara. The trees on Mont Baudin, situated about 1¾ miles south-eastward of Mont Bouet, have a ragged appearance, and their tops are about 486 feet ($141^{m}1$) high.

Just south-eastward of Mont Baudin are two hills named L'Ombrelle and Le Sommet de Trou, respectively; the former is 460 feet ($140^{m}2$) high, and has an umbrella-shaped tree on its summit; the latter is situated about 4 cables southward of L'Ombrelle. This chain of hills continues south-eastward, but with decreasing elevation.

In the afternoon, the sun shining upon the spire of the church at Libreville makes it appear as a white obelisk which can be seen from a distance of about 12 miles. The corrugated iron buildings at Kringer, situated 2 miles north-westward of Libreville, are also well defined.

Eastern shore.—Lights.—Close eastward of Cap Santa Clara lies Baie d'Acquengo, the western side of which is fringed with rocks, and at its head is the mouth of Rivière N'Tanday (*Lat. 0° 31′ N., Long. 9° 20′ E.*), whence the coast trends south-south-eastward for a distance of about 7 miles to Pointe des Normands (Norman point).

The coast is low and consists of a sandy beach, which is bordered by large trees, and on which the sea breaks heavily in bad weather.

Pointe Pandinou, situated about 3 miles north-westward of Pointe des Normands, is fronted by a rocky spit and by Banc de l'Adour. The large village of Anongomiani is situated about one mile southward

Charts 1361, 594, 2202a, 2203, 2127.

Chart 1877.

of Pointe Pandinou, and the head of Rivière Nkogo, which connects with Crique Tsini (page 147), is about one mile further south-eastward. The mouth of Crique Guéguay is about a quarter of a mile northward of Pointe des Normands. The mouth of this creek is distinguished by a large clump of tall trees on its northern side: the creek is navigable for small craft for a distance of about 1½ miles.

Southward of Crique Guéguay, the shore is bordered by a succession of plateaux, intersected by ravines through which flow brooks. Between Pointe des Normands and Pointe des Bretons (Bretons point), the shore is fronted by rocks and has sandy beaches at the head of its coves; on this part of the coast are the villages of Kringer, Quaben (Kwaben), and Louis.

Lights are occasionally exhibited from a radio mast, 278 feet ($84^{m}7$) high, about 1½ miles south-south-eastward of Pointe des Normands.

Dangers.—Buoyage.—Thémis bank lies in the centre of the approach to the estuary, about 5 miles south-westward of Cap Santa Clara.

The least depth over the bank is 3 fathoms ($5^{m}5$), sand, and there are other heads with depths of from 3¼ to 5 fathoms ($5^{m}9$ to $9^{m}1$) over them situated within a distance of about one mile from the shoalest patch, with greater depths between and around them.

A can light-and-whistle-buoy, painted red, with a cylindrical topmark, and exhibiting a *group flashing white* light having *two* flashes every *nine seconds*, is moored off the south-western end of Thémis bank; vessels should pass southward of this buoy.

Banc du Postillon (Postilion bank) is a detached rocky shoal, the position of which is usually indicated by eddies; it is situated about 3¾ miles south-south-westward of Cap Santa Clara, and over it there is a least depth of 19 feet ($5^{m}8$).

A spit, over which the depths are less than 5 fathoms ($9^{m}1$), extends in a north-westerly direction for about 5 miles from Pointe Pongara. On this spit are extensive shoals over which the depths are less than 2 fathoms ($3^{m}7$). Near the extremity of the spit is a depth of 2½ fathoms ($4^{m}6$).

On Mouche bank, the outer bank of this spit, the least depth is 1½ fathoms ($2^{m}7$); on Banc de l'Ouest (West bank), the middle bank of the spit, the least depth is 1¾ fathoms ($3^{m}2$); and on Banc de Pongara, the inner bank, there are depths of 3 feet ($0^{m}9$), in places. The sea breaks occasionally over these banks, and they may usually be distinguished, even in fine weather, by the ripples over them.

A black conical light-buoy, with a cone topmark, known as " Passe de la Pénélope" buoy, exhibiting a *flashing green* light every *six seconds*, is moored about 9 cables north-north-westward of the north-western edge of Mouche bank. A conical light-buoy, painted black, with a cone topmark, and exhibiting a *group flashing green* light having *two* flashes every *fifteen seconds*, is moored about 2 cables eastward of the north-eastern extremity of this bank, as defined by the 3-fathom ($5^{m}5$) line.

A spit, over which the depths are less than 5 fathoms ($9^{m}1$), extends from the coast close eastward of Cap Santa Clara (*Lat. 0° 30′ N., Long. 9° 19′ E.*) in a southerly direction to a position about 2¼ miles northward of Pointe Pongara. On this spit the principal shoals are Banc de la Recherche, Banc du Nisus, Banc du Caraïbe, and Roches

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Chart 1877.

Vialetes; these only will be described, the others can best be seen on the chart.

Banc de la Recherche, over which there is a least depth of 1¾ fathoms (3^{m}2), lies in the approach to Baie d'Acquengo, about 2 miles south-eastward of Cap Santa Clara (*Lat. 0° 30′ N., Long. 9° 19′ E.*).

Banc de Nisus is extensive; the least depth over it is 1¼ fathoms (2^{m}3) which is situated about 4 miles south-south-eastward of Cap Santa Clara.

There is a passage about three-quarters of a mile wide with depths in it of 4¼ fathoms (7^{m}8), between Banc de la Recherche and Banc du Nisus.

Banc du Caraïbe forms the southern extremity of the spit, the least depth over it is 2 fathoms (3^{m}7), which is situated about 3 miles northward of Pointe Pongara.

Roches Vialètes are rocky patches over which the depths are 2¼ fathoms (4^{m}1); they lie about 4 miles northward of Pointe Pongara, and their position is marked by eddies.

Banc du Papillon (Butterfly bank) is a narrow detached shoal, over which the depths are less than 5 fathoms (9^{m}1) lying close to, and on the north-eastern side of, the spit extending from Pointe Pongara: its shoalest part, over which there is a depth of 2½ fathoms (4^{m}6), lies about 1¾ miles north-north-westward of the beacon on Pointe Pongara.

A black conical light-buoy, with a cone topmark, exhibiting a *flashing green* light every *six seconds*, is moored off the north-western side of the shoalest part of Banc du Papillon.

Banc du Milieu (Middle bank) is an extensive bank of gravel; the least known depth on this bank is 2½ fathoms (4^{m}6), situated about 3¼ miles north-north-eastward of Pointe Pongara.

Bancs du Sud-Est are two in number, of gravel and rock, with depths of 4 to 5 fathoms (7^{m}3 to 9^{m}1) between them; they are situated about 2½ miles north-eastward, and 2 miles east-north-eastward, respectively, of Pointe Pongara. The least depth over the northern bank is 2¼ fathoms (4^{m}1), and that on the southern bank is 2¾ fathoms (5^{m}0).

A red can light-buoy, with cylindrical topmark, exhibiting a *flashing red* light every *six seconds*, is moored off the southern end of Bancs du Sud-Est.

Banc du Caiman (Alligator shoal), with a least depth of 1¾ fathoms (3^{m}2) over it, lies on the bank which fronts the northern shore of the estuary between Cap Santa Clara and Libreville, situated about 10 miles south-eastward. The bank lies about 6 miles south-south-eastward of Cap Santa Clara, and there is a channel between it and the shore bank northward of it, which is known as Banc de l'Adour and extends about 1½ miles offshore, with depths over it of less than 2 fathoms (3^{m}7).

Caution.—Too much dependence should not be placed on the chart, as it may be expected that the banks, acted upon by the strong currents and tidal streams, may shift from time to time.

The buoys in the approach to the Gabon are frequently out of their assigned positions; they cannot therefore be depended upon, and it is absolutely necessary for vessels using the channel to be able to fix their positions by bearings of objects on shore; soundings should be taken frequently.

Charts 1361, 594, 2202a, 2203, 2127,

Chart 1877.

Passe de la Pénélope.—The main channel to Rivière Gabon is Passe de la Pénélope, which leads southward of Thémis bank, Bancs Postillon, Caraïbe, and Banc du Sud-Est, and northward of Mouche bank, Banc de l'Ouest, Banc de Pongara, and Banc du Papillon.

It is the broadest, deepest, and most direct channel into the estuary, and is about one mile wide, with a least depth of 6 fathoms ($11^{m}0$).

Chart 1877, plan of Libreville anchorage.

Coast.—From Pointe des Bretons (*Lat. 0° 24′ N., Long. 9° 26′ E.*), rocks fringe the shore almost continuously to Libreville, a distance of about one mile, and thence as far as Pointe Glass, a further distance of about 1¾ miles where they end.

On a hill about 90 feet ($27^{m}4$) high, situated about 3¼ cables south-eastward of Pointe des Bretons, are the numerous buildings of the Roman Catholic mission; in 1939, however, these were reported to be nearly obscured by trees. The position of the mission is also indicated by a yellow mark formed by a landslide, near which is a boundary post. About 2 cables southward is the red-roofed hut at which the submarine cable is landed.

Anchorages.—Caution.—Buoy.—The anchorage for merchant vessels off Libreville is about 8½ cables south-westward of the pier in a depth of about 4¾ fathoms ($8^{m}7$), mud and clay, good holding ground. The depths at this anchorage were reported, in 1939, to be shoaling, and H.M.S. *Rochester* reported in the same year that the depths between the light-buoy on Bancs du Sud-Est and the anchorage off Libreville were from one to 1½ fathoms ($1^{m}8$ to $2^{m}7$) less than those shown on the chart. Care should be taken to avoid the submarine cable shown on chart 1877.

Vessels generally moor with the anchors north-north-westward and south-south-eastward of each other.

A buoy consisting of a white framework pyramid inscribed " RADE," surmounting a log raft, is moored about 6¾ cables south-westward of the pier at Libreville; it marks the anchorage for mail steamers.

Anchorage may also be found on a muddy bottom, further southward off Glass (*Lat. 0° 22′ N., Long. 9° 27′ E.*), at a distance of from three-quarters of a mile to 1¼ miles offshore, according to the draught of the vessel; but, when anchoring in this vicinity or further southward, care must be taken to avoid Banc de la Malouine, *see* page 158.

At these anchorages, a sea sometimes gets up at short notice, making communication with the shore, and the movement of lighters difficult; this is especially so when the wind is against the tidal stream.

Chart 1877.

During the dry season, from about June to September, small vessels anchor further up the river near Pointe Owendo, *see* page 158, to avoid the surf which breaks on the shore at Libreville. During this season vessels may also anchor off the southern shore, between Pointe Pongara and Crique Rogolay, situated about 3 miles south-south-eastward of it, in a depth of about 7 fathoms ($12^{m}8$) mud. The holding ground is excellent, but this anchorage is dangerous during the Tornado season, *see* page 158.

Small vessels may also anchor northward of Libreville, with the mission bearing between 010° and 090°, at about 7 or 8 cables from the shore, in depths of from about 4 to 5 fathoms ($7^{m}3$ to $9^{m}1$), over mud.

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Chart 1877.

Prohibited anchorages.—Anchorage is prohibited at the entrance to the estuary, northward of the parallel of Pointe Pongara, and westward of the meridian of the light-and-whistle-buoy marking Thémis bank.

Anchorage is also prohibited in an area reserved for seaplanes, of which the limits are as follows. On the north, by the line joining Mont Baudin with Gros Bouquet, which latter is on a hill 262 feet ($79^{m}6$) high, situated about one mile eastward of Kringer village. On the east by the shore. On the south by the line joining Les Jumeaux and the extremity of the iron pier at Libreville belonging to the Chargeurs Réunis, *see* page 157. Les Jumeaux are two conspicuous trees on a hill about 1¼ miles south-south-eastward of Mont Baudin. On the west, by the line joining the shoalest part of Bancs du Sud-Est and Anongomiani village, situated about one mile south-eastward of Pointe Pandinou.

When a red flag is shown at the signal mast, navigation is also prohibited within the above area.

Directions.—When approaching the Gabon from seaward and uncertain of the position of the vessel, soundings will give a good indication of the distance off the land, as depths of 100 fathoms ($182^{m}9$) run parallel with the coast at a distance of about 25 miles from it, and the depths increase rapidly seaward of that line, but decrease gradually and regularly towards the land.

Caution is necessary on account of the variable nature of the currents, *see* below.

In making the estuary, it may be well to remember that the land northward of it is high when compared with that southward, which is very low.

Coming from northward, vessels should endeavour to make the land in the vicinity of Cap Esteiras, before approaching the shoals in the mouth of the estuary.

Coming from southward, vessels should first sight the lighthouse on Pointe Gombé; when abreast that point, the land in the vicinity of Cap Santa Clara should be visible, and a course can then be set for the light-and-whistle-buoy on Thémis bank.

On opening the mouth of the estuary, the hills and spires in the vicinity of Libreville (*Lat. 0° 23′ N., Long. 9° 27′ E.*) may be identified, *see* page 156.

If, in consequence of fog or approaching nightfall, the marks leading through the channel cannot be made out, it would be prudent to anchor in a suitable depth outside. The out-going stream in this vicinity sometimes attains a rate of 4 or 5 knots.

Vessels should keep outside depths of 10 fathoms ($18^{m}3$), until the position has been accurately ascertained, and should then proceed through Passe de la Pénélope.

As previously stated, the positions of the buoys cannot be depended upon, but Mont Bouet bearing about 086°, or Mont Baudin bearing 092°, will lead through the fairway between Thémis bank and Mouche bank.

When northward of Mouche bank, the south-western extremity of Île Coniquet, bearing 122° and open south westward of Pointe Owendo, will lead between the banks northward and north-westward of Pointe Pongara.

Charts 1361, 594, 2202a, 2203, 2127.

Chart 1877.

The south-western extremity of Île Coniquet is well-defined from north-westward.

This line, however, passes close to the north-eastern side of Banc du Papillon, and close to the southern extremity of Bancs du Sud-Est; thus in their vicinity a vessel should keep about 4 cables north-eastward and south-westward, respectively, of the line. Also Pointe Owendo cannot as a rule be identified until nearing Bancs du Sud-Est; *see* view on chart 1877.

Small vessels, if coming from northward, can make use of the channel between Banc de la Recherche and Banc du Nisus, but it is not recommended as there are no leading marks. Another channel, which is sometimes used by vessels with local knowledge, is that between Banc du Nisus and Banc du Caraïbe.

There is also a channel between Banc du Milieu and Bancs du Sud-Est, and vessels taking this route leave Passe de la Pénélope when Pointe Gombé and Pointe Wingombé are nearly in line; thence they should steer with the Roman Catholic mission church bearing 081°: the time saved by taking this route is, however, inconsiderable.

Tidal streams and currents.—The tidal streams in the Gabon are strong and are influenced by the out-going river current. The in-going stream runs northward outside, and, when entering the estuary, it alters its direction clockwise, until on approaching Bancs du Sud-Est it is setting south-eastward: in the vicinity of Cap Santa Clara it is strong, and near Banc du Caraïbe it runs north-eastward, while in Passe de la Pénélope it sets towards the eastern shoals. The in-going stream runs at springs at the rate of from 1½ to 2 knots. The out-going stream sets fairly through the channel, except in Passe de la Pénélope, where it sets towards the western shoals and outside it runs southward: within the port, this stream often continues for ten hours, and frequently attains a rate of 4 knots and sometimes even 5 knots; at such times the strength and duration of the in-going stream are correspondingly reduced.

Freshets occur in the Gabon, principally at the beginning of the rainy season; they are, however, occasionally experienced at other times, and are sometimes sufficiently violent to interrupt communication with the left bank for several days. During these floods a nauseous odour pervades the whole estuary.

Rollers occur during the dry season, at which times the outer shoals break and a heavy swell sets into the estuary. The shore at Libreville (*Lat. 0° 23′ N., Long. 9° 27′ E.*) is then rendered difficult of approach, but communication is seldom actually interrupted.

For current outside the estuary, *see* page 32.

Local weather.—There is never a strong wind in the Estuary, except during the Tornado season.

There is no swell in the Estuary, but during high winds the sea becomes extremely choppy.

Climatic table.—*See* page 72.

Chart 1877, plan of Libreville anchorage.

Libreville.—Plateau is the name by which Libreville is known to the natives; from the roadstead its buildings appear strung out along the edge of a small hill which borders the shore; in the centre, amidst mango trees, is Government house with its turret and clock-face, and alongside it is the old hospital. Behind Government house

Charts 1361, 594, 2202a, 2203, 2127.

Chart 1877, plan of Libreville anchorage.

is the new hospital, composed of two symmetrical buildings which are visible from the anchorage. The church, with its white frontage, is prominent from afar.

A remarkable water tower, with the name "Libreville" painted on it, is situated about 5 cables east-north-eastward of the light on the pier at Libreville.

Southward of Government house, the shore is bordered by buildings as far as Glass, which is situated in a slight indentation between Pointe Pira and Pointe Glass, situated about three-quarters of a mile and 1¾ miles, respectively, southward of the concrete pier mentioned below. This place is the principal centre of the trade of the whole river.

A Roman Catholic chapel, visible from the roadstead, has been erected on a hill at Glass, and on a neighbouring hill named Baraka is the Protestant Mission station, with numerous buildings and spacious grounds. Houses fringe the shore as far southward as Pointe Owendo, *see* page 158.

In 1936, the population of Libreville was 6,000.

There is a British Consular Officer at Libreville (*Lat. 0° 23′ N., Long. 9° 27′ E.*).

Wharves.—Obstruction.—Light.—A wharf, belonging to Les Chargeurs Réunis, extends for about 492 feet ($150^{m}0$) from the shore at the foot of the plateau under Government House. There is a depth of 6½ feet ($2^{m}0$) alongside the end of the wharf, at low water.

A light is exhibited, at an elevation of 31 feet ($11^{m}0$), from a red pylon on a tower situated at the end of the wharf. There is also a signal mast and a 3½-ton steam crane at the end of the wharf.

A second, concrete, wharf known as Jetée de la Marine extends north-westward from the root of the above wharf.

An obstruction exists about 40 yards ($36^{m}6$) northward of the extremity of Jetée de la Marine. Boats should pass northward of this obstruction when rounding it.

There is also an iron jetty situated near the warehouse of Les Chargeurs Réunis, about 2½ cables north-north-westward of the above wharves but this is reserved, like the small mooring buoys about 2½ cables south-westward, for the use of the company.

A mole, about 394 feet ($120^{m}0$) in length, running parallel to the coast and which will have depths alongside of about 13 feet ($4^{m}0$) is under construction. It will be connected to the Jeteé de la Marine by a gangway.

Port facilities.—In 1948 there were seven lighters, each with a capacity of 80 tons.

Fresh meat can usually be obtained, also vegetables from June to September. Eggs, poultry, and fish are available.

Fresh water is obtainable, but there is no means of transporting it to ships.

There are two hospitals, one for Europeans and one for natives.

There is regular steamship communication with Europe.

There is regular air communication with Dakar and other places in French Africa and thence with Europe.

Libreville is connected to the general telegraph system, and there is a radio station, *see* page 44.

Charts 1361, 594, 2202a, 2203, 2127.

Chart 1877.

THE GABON ABOVE LIBREVILLE.—Outer Part.—Dangers.—Pointe Glass, *see* page 157, is fringed with rocks, but immediately southward of it, the north-eastern shore of the estuary recedes and forms a small cove, with a bottom of muddy sand, which is an excellent place in which to haul the seine. At about 6 cables south-eastward of the point is the mouth of Crique Igombray, whence the shore, for nearly 2 miles to Crique Lohuay, is low and bordered with mangroves. On the northern side of the entrance to Crique Igombray there is a sandy point. Crique Lohuay can be entered by boats, and has the village of Nomba on Pointe Lohuay, its southern entrance point.

Between Pointe Lohuay (*Lat. 0° 20′ N., Long. 9° 29′ E.*), and Fausse Pointe Owendo, a distance of about 3 miles, the shore is mostly low and bordered with mangroves, interrupted only, near its centre, by Crique Loëmbani.

Banc de la Malouine is of mud and sand, and extends about half a mile from the shore between Pointe Glass and Fausse Pointe Owendo; depths of less than 3 fathoms ($5^{m}5$) will be found from half a mile to one mile offshore between these points.

Pointe Owendo, one mile southward of the false point, is the southern extremity of a wedge-shaped projection on which are Montagnes de Conicoué (Konikue); the point is about 65 to 80 feet ($19^{m}8$ to $24^{m}4$) high, and the hills, which attain an elevation of from about 160 to 260 feet ($48^{m}8$ to $79^{m}2$), are surmounted by tall trees, *see* view on chart 1877. The Plateau of Owendo is partially cleared and cultivated, and is healthier than that of Libreville. Near the shore, on the south-western slope of the plateau, is a native village.

The south-western shore of the estuary trends in a south-south-easterly direction for about 3½ miles from Pointe Pongara, *see* page 151, to Pointe Ogollo, and from about one mile southward of Pointe Pongara it is lined with mangroves; for the first 2½ miles it is free from fringing banks, but off the mouth of Crique Rogolay, situated half a mile further southward, drying sandbanks extend about that distance offshore.

The entrance to the creek is marked by a group of tall trees, and the approach to it is between two sandbanks. On the southern side of the creek, which is infested with crocodiles, is the village of Denis. Good anchorage in depths of from 3½ to 5½ fathoms ($6^{m}4$ to $10^{m}1$), mud, will be found at about 5 cables north-eastward of the northern sandbank, but it should not be used during the Tornado season.

Pointe Eguirigui is situated about 11½ miles south-eastward of Pointe Ogollo (*Lat. 0° 18′ N., Long. 9° 23′ E.*), and between them, the southern bank of the Gabon recedes and is indented by the mouths of many creeks and a river; the bay thus formed is filled with banks of mud, and in some places there are patches of rock, so that for navigational purposes it is practically useless.

N'Djoué is a small fishing village, situated about 3 miles southward of Pointe Ogollo, at the foot of a mound on which there is a remarkable red tree, known as Arbre Mina.

The village of Petit Denis lies at the head of a cove, about 1¾ miles south-south-eastward of N'Djoué, on the eastern side of an island formed by Crique Apopay (Apopai); the two entrances to this creek are situated about one mile northward and southward, respectively, of the village.

Chart 1877.

One of the branches of Crique Apopay extends to the foot of the most remarkable hillock on this part of the coast, situated about one mile west-south-westward of N'Djoué, and on which is a wood named Bois de Punta Mina (Ponta Mina wood).

Between the southern mouth of Crique Apopay and Pointe Eguirigui, there are several creeks and a river; the principal creeks are named Mombay, Tutiay, and Obelo, and the river is called Assembé (Assombé). Access to the two first-named creeks is impracticable on account of the banks off-lying their mouths.

The bight between Pointe Ogollo and Pointe Eguirigui is filled with mudbanks, some of which uncover, those lying off Crique Apopay being known as Bancs de Petit Denis. Southward of these is Banc Espinassy, part of which uncovers.

Pointe Obelo, situated about 4 miles south-eastward of N'Djoué village, is fronted by Banc d'Obelo with depths of less than 2 fathoms (3^m7) over it, for a distance of about 2¼ miles northward; the inner part of this bank dries.

Banc Eguirigui extends, with depths of less than 2 fathoms (3^m7) over it, for 6½ miles north-westward of the point of the same name; parts of this bank dry.

Banc des Cigognes lies between Banc d'Obelo and the outer part of Banc Eguirigui, and extends to a position about 2½ miles northward of Pointe Obelo; the greater portion of this bank dries.

Banc du Como, which dries in places, lies about half a mile south-westward of the south-eastern extremity of Banc des Cigognes, with Pointe Uongue from which it is separated by a channel with depths of 4¾ fathoms (8^m7) about half a mile further southward.

A channel about 4 cables wide and steep-to on both sides. passes between Banc d'Obelo and Banc de Cigognes, and leads to the mouth of Crique Obelo, giving access to Rivière Assembé.

Pointe Eguirigui (*Lat. 0° 10′ N., Long. 9° 31′ E.*) is low-lying. Île Perroquet or M'Bini is of small extent, uninhabited, and thickly wooded, having at its northern point a remarkable tree, *see* view on chart 1877. It is situated about 2¼ miles northward of Pointe Eguirigui. A bank, which dries in places, extends about 2 miles in a west-north-westerly direction from the western side, and shoal water, in which the depths are less than one fathom (1^m8) extends a short distance south-eastward of the eastern side of the island, which is steep-to north-eastward. The channel between Île Perroquet and Pointe Eguirigui is very shallow, with patches of stones and broken shells which dry; in the channel are Banc de la Tourquoise, Banc du Rubis, and Banc du Pygmée. Île à Cailloux, which is 10 feet (3^m0) high, is situated at the eastern end of Banc du Rubis.

Inner part of estuary. — Dangers. — Anchorage. — Between Pointe Owendo, on the northern side of the estuary, *see* page 154, and Pointe Peini, situated about 2½ miles eastward, is a bight in which there is a strong tidal stream and tide-rip, but no swell as at Libreville. The bottom is mud, making the holding ground excellent. Île Coniquet lies south-eastward of the entrance to this bight, about 2 miles from Pointe Owendo. Anchorage may be obtained, either under the lee of Pointe Owendo, or in the middle of the channel between Pointe Peini and Île Coniquet in depths of from 4 to 5 fathoms (7^m3 to 9^m1), but

Chart 1877.

a bank with a depth of 2¾ fathoms (5^m0) has to be crossed to reach the latter anchorage.

Between Pointe Owendo and Pointe N'Goumbi, about 2 miles eastward, the shore recedes to the mouth of Crique Igoumé, forming Baie d'Igoumé: this bay is sheltered from the sea and tide rips, but is so choked with mud that a vessel drawing more than 13 feet (4^m0) cannot enter it. In the creek there is upwards of 13 feet (4^m0) from its mouth for 3 miles upstream, and boats can ascend for 4 miles, but the bar, which nearly fills the bay, appears almost to dry. On the shore of the bay, northward of Pointe Owendo, are the villages of Alenékéri and Conicoué (Konikue).

Within Île Coniquet (*Lat. 0° 16′ N., Long. 9° 33′ E.*), and eastward of Pointe Peini, is the mouth of Rivière Ikoï, *see* page below. Île Coniquet is well-wooded and fertile. The northern coast of the island is low, but its southern point, which is faced with perpendicular cliffs, rises to a high conical hill. The island is steep-to northward and southward, but a mudbank extends about 4 cables offshore between Pointe N'Kogo, the north-western point and Pointe Ikana, the south-western point.

A shelf with depths of three-quarters of a fathom (1^m4) over it, extends eastward for about 3 cables between Pointe Elindé the north-eastern point, and Pointe N'Guémanda, the south-eastern point. There are two large villages on the island.

From the mouth of Rivière Ikoï, the northern bank of the Gabon trends east-south-eastward for about 16 miles to Pointe Assango, at the mouth of Rivière Komo, *see* page 161. This stretch of coast is fronted by large banks of sand, rocks, and mud, and the land is elevated and covered with trees and vegetation. The most notable features are the large villages of Abuna and Etamayen and the mouth of Crique Banjia.

About 4 miles eastward of Crique Banjia is Rivière Rogole, the banks of which are cultivated, and about midway between this river and Pointe Assango are the large villages of Dongila and Bolendjo. Near Dongila is a factory and a Roman Catholic mission station, the buildings of the latter are situated on the heights and are prominent.

Roches de la Surprise dry, and lie in mid-stream about 2½ miles north-westward of Pointe Pungue, situated between the mouths of Rivière Komo and Rivière Ramboë. Two 6-foot (1^m8) patches lie 2 and 3 miles, respectively, north-westward of the rocks. The western end of Ilot Irongombene, in Rivière Ramboë, in line with Pointe Vidjue, bearing about 145°, leads westward of these dangers.

Between Pointe Eguirigui and Pointe Vidjue, the southern bank of this part of the Gabon trends east-south-eastward for about 14 miles to the mouth of Rivière Ramboë, *see* page 163, and is indented by the mouths of two other rivers; like the northern side, this part of the shore of the estuary is fronted by large banks of mud, sand, and stones.

Rivière Igombiné (Mafuga) is entered between shoal banks about 4½ miles eastward of Pointe Eguirigui, and has a depth in it of 21 feet (6^m4) for a distance of about 8¾ miles from the entrance, to a point about one mile below Macok, at which place there is a forestry establishment possessing a small pier.

Rivière Igume enters the estuary about 4 miles eastward of Rivière Igombiné, Pointe Ozumbele lies nearly midway between them.

Charts 1361, 594, 2202a, 2203, 2127.

Chart 1877.

Roche Basilic, over which there is a depth of 1½ feet (0^m5), lies at the mouth of Rivière Komo, about 2 miles north-eastward of Pointe Pungue (*Lat. 0° 08′ N., Long. 9° 46′ E.*), with another rock, over which there is a depth of 5 feet (1^m5), about three-quarters of a mile westward of it. Vessels proceeding up river should, after passing Pointe Ozumbele, keep to the southern side of the river.

The deep area of the Gabon ends approximately on a line joining Île Coniquet and Île Perroquet; above this line the depths are less than 5 fathoms (9^m1), diminishing to less than 3 fathoms (5^m5) before the mouths of Rivière Igombiné and Crique Banjia are reached.

TRIBUTARIES TO RIVIÈRE GABON.—Rivière Ikoï.—This river is entered between Pointe Peini and a point about 1¼ miles eastward; the former is fringed with rocks to a short distance; off the eastern side a mudbank extends as much as half a mile offshore. The least depth in the entrance, which is about 13 feet (4^m0) is found about 50 yards (45^m7) off the western entrance point. From about one mile north-eastward of Pointe Peini, the river deepens, and for about 2¼ miles the depths are from 16 to 33 feet (4^m9 to 10^m1) in the fairway.

Anchorage, with good holding ground, will be found anywhere in the channel, but the best is off the villages of Ayaya and Rigoho, situated on the left bank about 2 miles above the entrance.

About 3¼ miles north-eastward of Pointe Peini, Rivière Ikoï turns eastward and is joined by Rivière Macouma flowing from northward, in the former river there are depths of 13 feet (4^m0) as far as Vonmozel (Mbon Mogel), about 2½ miles above the junction of the two streams. Vessels entering this reach of Rivière Ikoï should hug the southern bank to avoid the mudbank which extends off the point on the opposite bank northward.

Anchorage will be found about a quarter of a mile below Vonmozel, which can easily be identified by a castellated house standing on a promontory.

A short distance above Vonmozel, Rivière Ikoï is only navigable by boats; further up-stream, the river is joined by Rivière N'Kogo; above this junction, both rivers are navigable by canoe to the foot of the hills in which they rise.

Rivière Macouma is navigable by vessels drawing up to 16 feet (4^m9) until abreast a small creek running round the foot of a hill named Saint Père (*Lat. 0° 21′ N., Long. 9° 34′ E.*); above this it is obstructed by rocks and sandbanks, but is navigable by boats for about 2 miles as far as the village of Macouma, and above that by canoe.

Rivière Mawish and Rivière Bollisokoé are tributaries to Rivière Macouma, and can be ascended by boat to the foot of the hills in which they rise, where are some villages.

Rivière Komo.—This river, which is from 2 to 3 miles wide at its mouth and may be ascended for a distance of about 45 miles, enters the Gabon between Pointe Assango, and Pointe Pungue, *see* page 150, and is only navigable by vessels of light draught with local knowledge. It contains a number of islets, many mudbanks, and a few rocks; the mudbanks often change both in position and extent, and the bottom is very irregular. The depths in the entrance are about 2¼ fathoms (4^m1).

Charts 1361, 594, 2202a, 2203, 2127.

Chart 1877.

Rivière Assango joins Rivière Komo on the eastern side of Pointe Assango (*Lat. 0° 10′ N., Long. 9° 49′ E.*); on its eastern entrance point, off which is a ledge of rocks, is the village of N'Gava. At about 6 miles up-stream Rivière Assango is joined by Rivière Inkube, which rises near Rivière Rogole, and the banks of which are uninhabited. Above this junction, Rivière Assango is narrow, bordered with rocks, and with many villages on its banks, to the third of which small vessels can ascend; its waters are fresh nearly all the year round.

Rivière Maga and Rivière Tcholio join Rivière Komo by a common mouth on its southern side opposite N'Gava. Rivière Maga can be ascended by small craft for a distance of about 13 miles to the village of Tornebeim, above which it is only navigable by boats.

Rivière Tcholio connects Rivière Komo with Rivière Jambi, and thence with Rivière Ramboë.

Île Sika is small and is situated on the southern side of Rivière Komo, just above the mouth of Rivière Maga; it shows up on account of its large trees. The bottom in the vicinity is irregular and rocky, and a sandbank, which dries in places, extends south-westward from it for nearly one mile.

Above Île Sika, the channel follows the northern bank of the river as far as Trou de Diable, situated about one mile above the steep white beach at Leuve village.

Ninge Buende is an island on the south side of Trou de Diable, with a village on its northern side; it has channels on either side, but Trou de Diable, which passes northward, should be used. This channel is narrow but deep, and the tidal streams in it are strong, hence its name. Alum and Afnega are two villages situated above the white cliffs on the rock-bound northern shore abreast Ninge Buende. Anchorage may be obtained in the positions indicated on the chart.

A short distance above Ninge Buende there are channels on either side of the island of Ninge Uate, but that southward of it is the deeper; on the southern bank of the river, abreast the end of Ninge Uate is the village of Bumba.

Pointe Mafu (*Lat. 0° 10′ N., Long. 10° 01′ E.*), on which there is a village of the same name, is on the northern side of the river 1½ miles above the eastern end of Ninge Uate; there are cliffs at Mafu village, but the point is covered with mangroves.

Abreast Mafu village is Île Sombie, the channel running on the northern side of the islet. Excellent anchorage is found off the village of Timbie, near a factory situated about one mile north-eastward of the eastern end of Île Sombie. Near this anchorage is the mouth of Crique Ogula, a narrow waterway navigable only by boats; its banks are densely populated.

Above this anchorage, navigation though not difficult, requires local knowledge; it is safest at low water, when a wreck off the Makormabum banks, on the northern side of the river, and other dangers are visible. The river takes a sharp turn above Alona and Bekume villages on the southern bank, about 2½ miles south-eastward of Timbie, and the entrance to Crique N'Jua on the northern bank.

Ninge-Ninge is an island situated at the junction of Rivière Elobe, *see* page 163, and Rivière Bokue, *see* page 163, with Rivière Komo, about 20 miles above the mouth of the latter. A large sandbank

Charts 1361, 594, 2202a, 2203, 2127.

Chart 1877.

extends about half a mile from the western point of this island, and rocks from its eastern side.

Northward of the island there is a depth of only 2 feet ($0^{m}6$), but in the vicinity there is a convenient anchorage, above the bar, at which to await the rising tide; the deeper channel runs along the southern and north-eastern sides of Ninge-Ninge. The river water at Ninge-Ninge is fresh. High water is more than 3 hours later than at Libreville, and the tidal streams are strong. There are two factories on the island and another further up on the left bank of the river.

On the northern bank of the river, opposite Ninge-Ninge and near the village of Kango, are two other villages, the former is the residence of the Administrator and there is a military post; there is also a telegraph office.

Above Ninge-Ninge (*Lat. 0° 09′ N., Long. 10° 06′ E.*), Rivière Komo flows from northward, and its banks are well-populated, but its channels are obstructed by rocks and sandbanks. At Ayémé there is a factory and an experimental plantation. At Fulah there is a military post. A shallow-draught vessel can, in case of emergency, ascend to Fula Bifum, but it would be necessary to leave Kango at about half-flood tide. Steamboats can ascend to the junction of the M'Bei with Rivière Komo at Malaglia (*Lat. 0° 20′ N., Long. 10° 11′ E.*), above which snags and sharp turns prevent navigation except by canoe. Above Evormakok (Varmoko), about 11 miles up-stream from Kango, the current becomes very swift and great caution is necessary. The effect of the tide is felt as far up as Belli, one mile below Evormakok.

Rivière Bokue flows from eastward and is navigable as far as Karamaïen, a distance of about 11 miles. After having passed the rock and bank which lie on the southern side, near the entrance to the river, excellent anchorage will be found off the villages of Duma, Akinetom, and Djogeboat; the river is easily navigable for the first 7 miles, to a point at which it is joined, on its southern bank, by a large creek, the banks of which are densely populated. Above this point the depths become less and the channel passes between banks of sand and rock.

Crique Tchalé connects Rivière Komo, near the village of Lamba, with Rivière Bokue. It is navigable by small vessels on the rising tide.

Rivière Elobe flows into Rivière Komo from southward, it is a small stream, only navigable by boats, with several villages upon its banks.

Rivière Ramboë.—This river is entered between Pointe Vidjue and Pointe Pungue, *see* page 150. Pointe Vidjue is cliffy and distinguished by a remarkable tree near which is the village of Nango. A bank, with a depth of 4 feet ($1^{m}2$) over it, extends northward from Îlot Irongombene, a low wooded islet situated about 2 miles southward of Pointe Pungue; this bank runs parallel with the eastern bank of the river for about 2½ miles, narrowing the entrance channel between them to 2 cables, with a least depth of 7 feet ($2^{m}1$). On entering the river the eastern bank should be hugged until Îlot Irongombene has been passed, after which there is no danger for small craft as far as Chinchua village, in which is the residence of a government official, situated about 4½ miles above the islet.

Chart 1361.

Rivière Bilagone and Rivière Jambi unite with Rivière Ramboë in

Charts 1361, 594, 2202a, 2203, 2127.

Chart 1361.

the vicinity of Chinchua (*Lat. 0° 00′ N., Long. 9° 50′ E.*); they are both narrow and deep.

Mandji, Acondjo, and Massa are the only villages of any importance on the Rivière Ramboë above Chinchua, and are situated about 20, 24, and 35 miles, respectively, above that place.

Near Mandji is the mouth of a creek which communicates with Lac Azingo, and thence by Azingo and Orembo-Wango rivers, with the Fleuve Ogooué, *see* page 170, and Lambaréné, *see* page 175.

Acondjo is the most important of the three villages. Good anchorage will be found off it, in a depth of about 26 feet ($7^{m}9$), but the river is only about half a cable in width, and, as the influence of the tide is still felt there, vessels have to moor head and stern. Above Acondjo the river is navigable to a point about 4 miles below the village of Massa, after which it becomes very narrow, the bottom is obstructed by snags, and enormous mangroves almost join branches from bank to bank.

The influence of the tide is felt up to 4 miles below Massa. The current in the river runs at the rate of from 2 to 3 knots.

POINTE GOMBÉ TO CAP LOPEZ.—Aspect.—From Pointe Gombé, *see* page 151, to Cap Lopez, the westernmost point of the southern part of the continent of Africa, the distance is about 67 miles in a south-westerly direction, the intervening coast receding to form a bight, the southern part of which is known as Baie du Cap Lopez.

For the first 18 miles the coast trends southward; it is moderately high, very level, and is fronted by a narrow beach of white sand which is intersected in places by the mouths of several creeks. At about 12 miles southward of Pointe Gombé is a village, the huts of which are partly concealed by the trees. Close southward of this village are two dunes covered with scrub, which gives them a reddish tint; they are of moderate height, uneven, and their summits are covered with trees; farther southward there are some quite barren hillocks which show up against the surrounding verdure; at some distance inland are several heights.

Near the Equator, and about 3 miles inland, a chain of hills or dunes, about 100 feet ($30^{m}5$) high, begins, and runs southward and parallel with the coast. One of these, situated about 23 miles southward of Pointe Gombé, is very prominent; it is a hillock of white sand, covered with scrub, and its western side is cliffy; it slopes gently to the summit at its northern end, but presents a sudden fall at its southern extremity; from seaward it shows up, with a reddish tint, above the trees which line the coast. On the coast abreast this hillock is the large village of Kokobe, which is situated about one mile north-eastward of Pointe Ognone.

At the southern end of the dunes, about 30 miles southward of Pointe Gombé, there is a very remarkable bare and flat-topped, white hillock, named La Dune Plate (*Lat. 0° 11′ S., Long. 9° 23′ E.*), which can be seen above the tree-tops.

Les Mamelles are prominent paps situated about 3 miles south-westward of La Dune Plate, and about 2 miles inland; at about 12 miles farther southward, three grassy plains, separated by dense woods, extend to the coast and are visible at a distance of about 10 miles, forming the most outstanding landmark on this part of the

Charts 594, 2202a, 2203, 2127.

Chart 1361.

coast. In the southern corner of the centre plain is the village of Sangatanga.

Mont Sangatanga rises about 26 miles southward of Les Mamelles and about 7 miles inland; although not of great height, it may be seen, in clear weather, above the low and wooded coast, at a distance of about 20 miles; during the dry season, however, it is often hidden by mist.

Caution.—In the vicinity of the coast between the Rivière Gabon and Cap Lopez, a vessel should not get into depths of less than 10 fathoms ($18^{m}3$), nor approach the land within a distance of 3 miles, for the coast has only been partially surveyed.

Coast.—From Pointe Gombé to Pointe Sangatanga, a distance of about 48 miles in a southerly direction, the coast is free from off-lying dangers, and the soundings are remarkably regular, except in the vicinity, and southward of, Les Mamelles, where a bank, with depths of less than 3 fathoms ($5^{m}5$) over it, extends about 3 miles from the coast. From 2 miles and upwards offshore, the general nature of the bottom is sand and mud, intermixed, in places, with gravel and shells.

A small river flows into a little bay about 20 miles southward of Pointe Gombé (*Lat. 0° 18′ N., Long. 9° 19′ E.*), and its position may be determined by a sudden break in the trees. The mouth of the river occasionally shifts as much as half a mile in a short space of time.

A reef, upon which the sea occasionally breaks, extends one mile offshore westward of Les Mamelles, in a west-north-westerly direction.

Pointe Ekoueta-Niliani is situated about 14 miles north-north-eastward of Pointe Sangatanga, and northward of it is a stream, with a remarkable round clump of light green trees close to it near the beach; on this beach there is sometimes a slight surf, it is therefore necessary to be careful when landing. About one mile northward of this stream is the mouth of Rivière Oyani, which, flowing between Les Mamelles and La Dune Plate, can be ascended by canoes for about 15 miles.

Roche Fanaës (Île Fanaës), a rocky shoal which dries 3 feet ($0^{m}9$), lies about one mile from the coast, abreast the mouth of a small stream about 4½ miles north-eastward of Pointe Sangatanga; this shoal is situated on the bank which extends from the coast northward of Pointe Sangatanga. Immediately northward of the mouth of the stream is the village of Sangatanga, which cannot be distinguished at a distance of over 6 miles, but its position is indicated by the three grassy plains previously described.

Anchorages.—The following anchorages are available for vessels with local knowledge. The best anchorage off the bight 20 miles southward of Pointe Gombé, is in a depth of about 6 fathoms ($11^{m}0$), mud, with the northernmost pap of Les Mamelles bearing 166°, and the break in the trees bearing 094°; closer in than this position, the bottom is rocky; boats may land in the corner of the bight except when rollers set in heavily.

The depths in the vicinity of Sangatanga decrease regularly from 13 to 3 fathoms ($23^{m}8$ to $5^{m}5$), and a vessel may anchor about 2½ miles from the coast with Les Mamelles bearing about 036°, and Sangatanga village bearing about 098°.

Charts 604, 594, 1013, 2202a, 2203, 2127.

Chart 1361.

Coast.—Dangers.—Caution.—Baie de Sangatanga is a slight indentation in the coast between Pointe Sangatanga and Pointe Tambinione, about 5 miles south-westward; its shores are low and wooded, with a narrow sandy beach.

Pointe Tambinione (*Lat. 0° 35′ S., Long. 9° 08′ E.*), when seen from southward, assumes an arched appearance and shows as a somewhat salient feature. A reef of rocks extends for 8 cables in a westerly direction from the point, and a shoal with depths of less than 13 feet ($4^{m}0$) extends about 7 miles north-westward from the point. On the extremity of this shoal there is a depth of 2 fathoms ($3^{m}7$), with only one fathom ($1^{m}8$) at a short distance within, and there is every reason to suppose that the outer edge of the bank continues to a position about 1½ miles westward of Roche Fanaës.

About 3½ miles northward of Pointe Tambinione there is a depth of half a fathom ($0^{m}9$).

The approaches to Baie de Sangatanga have been but imperfectly surveyed, and, as the depths are very irregular, the greatest caution is necessary.

Current.—The current off this part of the coast sets generally north-north-eastward at a rate of not more than half a knot, except after a continued fresh south-westerly wind or a flood in Fleuve Ogooué, *see* also page 168.

Off-lying dangers.—Lee bank, on which there is a depth of only 9 feet ($2^{m}7$), is charted about 13 miles westward of Pointe Sangatanga. A patch, over which there is a depth of 4¾ fathoms ($8^{m}7$), is charted about 3 miles west-north-westward of Lee bank. These are, apparently, outlying heads of the extensive bank which fills Baie de Nazaré (Nazareth).

Baie de Nazaré.—This bay is entered between Pointe Weré (Wézé), situated about 5½ miles south-westward of Pointe Tambinione and Pointe Apumanda (Apoumanda), situated about 6 miles further westward.

The mud brought down by the rivers at the head of the bay, one of which is a mouth of Fleuve Ogooué, has almost filled Baie de Nazaré with an immense shallow bank, on which there is a depth of less than 13 feet ($4^{m}0$) and which nearly dries in places, extending about 5 miles northward from Pointe Apumanda.

On the eastern side of the bay, in the following order from Pointe Weré (*Lat. 0° 38′ S., Long. 9° 06′ E.*), are the mouths of three small rivers; Rivière Weré, the entrance to which is closed by a mudbank, Rivière Abua Uiri, up which a small vessel can proceed, and Rivière Lisboa, which is also navigable and has on its bank a large village of the same name. The entrance to this last river has mudbanks on either side which dry.

At the head of Baie de Nazaré, from east to west, are the mouths of Rivière N'Chile, Rivière Rembo Gangoué, and one of the entrances to Fleuve Ogooué. The first two are both navigable by small steam vessels and communicate with the Ogooué. The mudbank which fills the whole of the western side of the bay, from the mouth of the Ogooué to Pointe Apumanda, dries in many places.

Eastward of the mouth of the Ogooué and off the entrance to Rivière Gangoué, are three wooded islets. Îlot Coubié is the western and largest islet, Ningué the central, and Gogué the eastern and smallest.

Charts 604, 1361, 594, 1013, 2202a, 2203, 2127.

Chart 604, plan of Baie du Cap Lopez, and chart 1361.

Baie du Cap Lopez.—This bay is entered between Pointe Apumanda and Cap Lopez, situated about 17 miles westward; its shores are very low and covered with mangroves. At the head of the bay is the mouth of Rivière Oranga, and on its eastern side are those of Rivière Yombé and Rivière Kondjo. The bay is encumbered with shoals and must be approached with great caution; the western, or Cap Lopez, side is the deeper.

Aspect.—In approaching the bay, Cap Lopez, a clump of trees situated on Pointe du Prince, Pointe Clairette situated about 5½ miles south-eastward of it, and a group of trees a little northward of Port Gentil, are easily made out.

The factories, flagstaffs, water-tower and white roofs of the houses at Port Gentil show up well when approaching the anchorage off that place on the western side of the bay. Île Pavaria, situated on the western side of the entrance to Rivière Kondjo, and about 6½ miles south-westward of Pointe Apumanda, may be identified, as it is slightly higher than the neighbouring coast and has on it some coconut palms.

Banc du Prince.—Light-and-whistle-buoy.—This bank is a spit extending in a north-easterly direction for a distance of about 4¾ miles from Pointe du Prince, which latter is situated about 3½ miles south-eastward of Cap Lopez lighthouse. Depths of 6 feet ($1^{m}8$) or less extend about one mile north-eastward from Pointe du Prince and seaward of this the depths over the bank are from 14 to 17 feet ($4^{m}3$ to $5^{m}2$). The bank is steep-to, having depths of from 10 to 30 fathoms ($18^{m}3$ to $54^{m}9$) close outside it.

The outer part of this bank is covered by the *red* sector of the light at Port Gentil, between the bearings of 166° and 201°.

A conical light-and-whistle-buoy, painted red on top and white below, with topmark of two cones, bases together, and exhibiting a *group flashing white* light having *two* flashes every *nine seconds*, the exact position of which cannot be depended upon, is moored off the north-eastern extremity of Banc du Prince.

Chart 604, plan of Baie du Cap Lopez.

Anchorage.—Baie du Prince is situated on the northern side of the bank of that name, and between it and Cap Lopez. It affords anchorage at its head, on the edge of the flats which front the mouth of Crique aux Elephants. There is an abandoned whaling station in this bay. Great care must be observed in approaching this anchorage, as the depths shoal very quickly inside 15 fathoms ($27^{m}4$).

Cap Lopez.—Beacon.—Light.—Cap Lopez (*Lat. 0° 38′ S., Long. 8° 42′ E.*) marks the southern limit of the bight of Biafra. It is the northern extremity of Île Lopez or Mandji, a low wooded island formed by the two mouths of the Ogooué.

The shape of the land at Cap Lopez is now different from that indicated on the chart.

The cape itself consists of a low plain, covered with pasture and bushes for a distance of about 3 cables. Lac des Baleiniers lies just inside the north-eastern extremity of the cape. A house with a square tower is visible for a considerable distance, as also are the chimney and elevator of an abandoned factory. A masonry beacon 33 feet ($10^{m}0$) in height, known as Balise des Capitaines, standing on the edge of the forest, may be seen at more than 10 miles. The cape is easily identified on account of its salient position.

Charts 1361, 594, 1013, 2202a, 2203, 2127.

Chart 604, plan of Baie du Cap Lopez.

Seen from northward, the cape appears as an island, and the large mangroves, which tower above the scrubby undergrowth, may be seen at a distance of 15 or 16 miles, *see* view facing page **174**.

It has been observed that from 4 miles southward of the cape to 7 miles northward of it, the edge of the greyish-green water issuing from the Ogooué is in well-marked contrast to that of the ocean, and that the line of demarcation is also indicated by tide-rips.

The former extremity of the cape is now submerged, and forms a spit named Banc du Loiret, over which there is a depth of 14 feet ($4^{m}3$) and which, in 1939, extended nearly 1½ miles northward from the lighthouse; depths of 10 fathoms ($18^{m}3$), or less, extend about 8 cables north-westward from the lighthouse.

It is a matter of some difficulty to estimate a vessel's distance from the cape when rounding it, so that it should be given a wide berth. Strong eddies and discoloured water will be found in the neighbourhood of the bank.

A light is exhibited, at an elevation of 105 feet ($32^{m}0$), from a white tower about 98 feet ($29^{m}9$) in height, situated on Cap Lopez. The light is visible from 007° through East, to 300°.

Current.—In the vicinity of Cap Lopez (*Lat. 0° 38′ S., Long. 8° 42′ E.*) an eddy current has been observed to set towards Banc du Loiret or into Baie du Prince.

Port Gentil.—The settlement is situated on the shore of a slight indentation in the coast between Pointe Clairette and Pointe Akosso, on the western side of the mouth of Rivière Oranga.

It is the seat of residence of the Administrator of the Province of Ogooué Maritime.

In 1947 the population was 5,800, of whom 300 were French.

There are several factories, and a custom-house with a flagstaff.

Timber is the principal export.

In the surrounding country elephant and buffalo may at times be found, and there are hippopotami in the numerous waterways which intersect the land. The natives consider monkeys sacred and worship them as fetish animals.

Dangers.—Buoy.—Caution.—On Pointe Clairette is a cable hut, and for about 1¼ miles westward of the northern side of the point as far as Île aux Pigeons, a shoal with depths of less than 3 fathoms ($5^{m}5$) over it, extends northward for about half a mile (*Lat. 0° 41′ S., Long. 8° 47′ E.*).

Banc de l'Alcyon, a shallow spit over which there is a depth of only 16 feet ($4^{m}9$) near its extremity, extends in an east-north-easterly direction for about 1½ miles, from a position on the coast one mile southward of Pointe Clairette. The seaward edges of the bank are steep-to.

Banc du Talisman, another similar spit, over which there is a depth of only 1¼ fathoms ($2^{m}3$) near its extremity, extends in an east-north-easterly direction for about 8 cables from a position on the coast about 1¾ miles southward of Pointe Clairette. This shoal is steep-to.

A conical buoy, painted, the top part red and the lower part white, is moored off the north-eastern corner of Banc du Talisman.

Banc de l'Alcyon and Banc du Talisman are covered by the *red* sector of Port Gentil light, between the bearings of 166° and 201°.

Banc Rousselot, over which there is a depth of 14 feet ($4^{m}3$) at its

Chart 604, plan of Baie du Cap Lopez.

north-eastern extremity, extends about one mile eastward from Pointe Akosso.

Too much dependence should not be placed on the chart, as it may be expected that the banks, acted upon by the strong tidal streams and currents from the rivers, may shift from time to time.

Lights.—Beacons.—Leading line.—A light is exhibited, at an elevation of 49 feet (14^{m}9), from a white pylon situated about 2 cables west-north-westward of Pointe Akosso (*Lat. 0° 44′ S., Long. 8° 47′ E.*). The light shows a *red* sector from 166° to 201°; a *white* sector thence to 287°, and is obscured elsewhere.

A light is exhibited from the head of the wharf, situated about one mile north-north-westward of Pointe Akosso.

A light is exhibited, at an elevation of 33 feet (10^{m}0), from a white mast on a white stone pyramid, known as La Pyramide des Chargeurs, situated about 2 cables westward of the head of the wharf. A beacon, painted in black and white horizontal stripes, and surmounted by a square, at an elevation of 66 feet (20^{m}1), is situated about 6 cables south-westward of the above. The pyramid and the beacon in line, bearing 231°, lead close southward of Banc du Talisman. In 1947, it was reported that the rear beacon was obscured by trees if the vessel gets a short distance northward or southward of the leading line.

Anchorage.—Excellent anchorage, which is cool and healthy during the months of July, August, and September, may be obtained in the bay southward of Banc du Talisman buoy. The best berth is in a depth of from 6 to 7 fathoms (11^{m}0 to 12^{m}8), mud, about 4 cables eastward of La Pyramide des Chargeurs. During the Tornado season, however, vessels anchor at least 7 cables east-north-eastward of the settlement.

The tidal streams at the anchorage are rotary, causing a vessel to swing right round its anchor. The ebb stream sets north-north-westward, at a distance of up to one mile from the shore, at a maximum rate of about one knot.

Vessels should moor with a long scope of cable, and open hawse north-eastward.

Anchorage may also be obtained about 3 cables south-eastward of Pointe Clairette, in a depth of about 10 fathoms (18^{m}3), mud.

The bay is full of sharks.

An area, which is reserved for the use of seaplanes, extends about 8½ cables from the coast between La Pyramide des Chargeurs and the Peyrebere (Peyrebyre) factory, situated about 9 cables north-westward of it.

Directions.—If coming from southward by day, Port Gentil may be approached without difficulty. Care should be taken to pass at least one mile westward of Cap Lopez lighthouse (*Lat. 0° 38′ S., Long. 8° 42′ E.*), and to maintain a course of not more than 023°, until the lighthouse bears about 163°, when the cape should be rounded at a distance of about 1½ miles until the lighthouse bears 180°, when course should be altered eastward to round Banc du Prince light-and-whistle-buoy, being careful not to cross the line of Cap Lopez lighthouse in line with Balise des Capitaines (page 167), bearing 255°, which is a clearing mark for Banc du Prince.

This line should not be crossed, nor the whistle-buoy rounded, until the remarkable trees on Pointe Akosso, *see* page 168, bear 190°, when

Chart 604, plan of Baie du Cap Lopez.

the vessel should steer southward and proceed to the required anchorage, taking care to avoid Banc de l'Alcyon and Banc du Talisman.

By night, the cape should be rounded as described above, and when the light bears 180°, the vessel should steer eastward to round the light-and-whistle-buoy on Banc du Prince, taking care to keep northward of Banc du Prince by bearings of Cap Lopez light. When in the *white* sector of Port Gentil light near Pointe Akosso, but not before, it should be steered for, taking care not to be set into the *red* sector by the current.

Port facilities.—The custom-house pier has steps at its head, alongside which the least depth is 12 feet ($3^{m}7$).

A concrete pier is situated close northward of the custom-house pier, but it is in bad condition. There is a depth of 10 feet ($3^{m}0$) at the head of the pier at low water. Landing can be effected at the steps, but it is recommended to go alongside those on the western side, because the continuous west-going current is apt to jam a boat under the platform of the pier on the other side.

There is a floating pontoon quay, about 500 feet ($152^{m}4$) in length, near Pointe Clairette.

There are several mooring buoys for the use of small craft. There is a patent slip near the establishment of the Chargeurs Réums, where repairs to small vessels can be effected.

Fresh meat, fish and game are obtainable, but vegetables are very scarce. Supplies of fresh water cannot be relied upon.

There is a hospital with a large number of beds for Europeans.

River steamers connect regularly with Lambaréné (*Lat. 0° 41′ S., Long. 10° 13′ E.*) (page 175) and with La Lagune de Fernan Vaz (page 175).

There is regular steamship communication with Europe.

There is regular air-line communication with Pointe-Noire and Brazzaville, and with Douala, Lagos and Dakar.

Port Gentil is connected with the general telegraph and telephone system.

Charts 1361, 604.

FLEUVE OGOOUÉ.—General remarks.—This river, the delta of which forms the promontory of Cap Lopez, is one of the great rivers of Africa, its course lying along the equator for over 600 miles. Its breadth, which is often reduced by islands, though navigation is not hindered by them, varies from half a cable to over one mile. In the lower river, the banks are for the most part flat and covered with mangroves; these give way to plains of papyrus, and still further upstream, the banks, on which are magnificent trees, become gradually higher.

Hills appear in the neighbourhood of Lambaréné (*Lat. 0° 41′ S., Long. 10° 13′ E.*), situated about 80 miles from the coast as the crow flies, after which the land becomes flat again, only to rise as mountains in the vicinity of N'Djolé, about 43 miles further up the river.

Its main affluent is Rivière N'Gounié, which joins it from southward about 7 miles above Lambaréné. Rivière Ivindo and Rivière Kano, both flow from northward, and join the Ogooué (Ogowé), respectively, at Kankan (*Lat. 0° 08′ S., Long. 12° 08′ E.*), and Alembe, about 10 miles above N'Djolé.

Charts 1361, 594, 1013, 2202a, 2203, 2127.

The river has an immense delta which begins at Lambaréné, and is a tradeless region supremely damp; indeed the whole of it and the country from the Gabon to Setté Cama, 130 miles south-south-eastward of Cap Lopez, is under water during the long wet season, save for the strange bubble-shaped mountains like Mont Sangatanga, *see* page 165, and Mont Mandji near the west bank of Rivière Ramboë, about 50 miles south-eastward of Pointe Gombé.

The natives frequently abandon their villages, and many of the villages shown on the charts no longer exist in the position indicated. When new villages are established the old names are sometimes retained, even though the location has been changed.

Navigation in the Ogooué is always tricky, and the vessel should be quick on her helm on account of the numerous turns which have to be negotiated to pass between the banks; she should also have a good turn of speed to stem the current, which sometimes runs at a rate of 3 or 4 knots. It is necessary to keep a good look out ahead, and to be always ready to move the rudder, for, when the river is in flood, it brings down enormous partly submerged trees; sometimes these are stuck in the mud and completely submerged, when they become extremely dangerous and their presence is only indicated by a slight ripple on the surface. Steel vessels run the risk of having their hulls pierced by these snags, and one has already been lost in this manner. Finally, at low water, it is necessary in places to keep within from 10 to 13 feet ($3^{m}0$ to $4^{m}0$) of the bank, and the slightest mistake in steering will infallibly put the vessel ashore.

Except at the mouth of Rivière N'Gounie, there are no dangerous rocks, and when the river is high these can be cleared, as there will then be a depth of from 10 to 13 feet ($3^{m}0$ to $4^{m}0$) over them. During the dry season it is preferable to anchor below them.

The effects of running on to the shoals in the river are not very grave, and as long as the accident does not occur when the river level is low, the vessels generally get off after a few hours; in the latter case, however, she may be immobilised for several weeks, perhaps months. Stranding on the rising river need not be feared, usually a few turns of the engine astern is sufficient to clear the vessel.

There is a regular service all year round between Port Gentil and Lambaréné, and vessels drawing up to 3½ feet ($1^{m}1$) can ascend at all seasons as far as N'Djolé.

It is always dangerous to navigate the river at night; in emergencies, however, and when the river is high, certain parts where the shoals are few, could be negotiated at night with an experienced pilot; particularly that part between Port Gentil and Île Buiti (*Lat. 1° 03′ S., Long. 9° 09′ E.*), *via* Rivière Yombé, and Affogozzo and Nango-Nangué channels, *see* page 174.

Pilots.—Native pilots are available at Port Gentil and Ngola, but good pilots are scarce; the best are those attached to the different factories on the river who are used to steam vessels. Those who have left the service of the companies should be engaged with caution, and any who have not practised for a year or more should not be employed.

Current.—At high river the mean velocity of the current has been found to be from one to 2 knots below Lambaréné (*Lat. 0° 41′ S., Long. 10° 13′ E.*), and from 2 to 3 knots between that place and N'Djolé. A very strong current runs from Lambaréné to abreast the arm, the

Charts 1361, 604.

furthest upstream, which leads to Lake Onangé, and also between N'Djolé and the village of D'Zoum about 10 miles below that place. In the rapids between the second islet at N'Djolé and the river bank, the current has been found to run at 5 knots.

Above the Mandji channel, about 13 miles within the entrance, the current is always running down stream, and the river is fresh at about one mile higher up.

Depths.—The depths in the river vary greatly on account of the numerous banks which succeed one another almost without interruption, from its mouth to N'Djolé; between these banks, at certain places, least depths of 3 feet (0^{m}9) will be found; in other places and generally where the river is narrow, the least depth is from 30 to 36 feet (9^{m}1 to 11^{m}0).

A vessel drawing not more than 6 feet (1^{m}8) can always ascend as far as Yombé (*Lat. 1° 01′ S., Long. 9° 28′ E.*), a village in the Kama country, situated at the junction of Rivière Obando and Fleuve Ogooué, about 36 miles from the entrance as the crow flies; but it would be imprudent for such a vessel to venture further except between April 1st and May 15th, or November 1st and December 31st.

River level.—The river usually attains its highest level at the end of April and in the month of May; at the end of May the dry season begins and the fall is very rapid; in July and August the river is lowest, and navigation becomes very difficult for a vessel drawing more than 3 feet (0^{m}9).

In the first week in September, when the rainy season in the upper river begins, the rise commences; it increases rapidly in October and November, and ceases at the end of the latter month. Vessels drawing 8 feet (2^{m}4), and even 10 feet (3^{m}0), can navigate at this season, though the river is not then so high as in May. From the month of December, the " Little dry season " begins and scarcely lasts the month, the river then falling. During the " Little dry season " the river is low, but not so low as in July, and is quite navigable.

From January 15th the river rises and falls alternately, until April 15th, after which it rises very rapidly, and the high river season, lasting till the end of May, begins.

In places the difference between the level of the river in the dry season and of that in the wet season, is as much as from 13 to 16½ feet (4^{m}0 to 5^{m}0).

Mouths of the Ogooué in Baie du Cap Lopez.—Light.—Beacons.—The entrance to the Ogooué in the south-western corner of Baie de Nazaré, *see* page 166, is dangerous and should not be attempted. The above entrance is also the eastern mouth of Rivière Kondjo, and lies close westward of Ilot Coubié, *see* page 166.

Chart 604, plan of Baie du Cap Lopez.

The western mouth of Rivière Kondjo is entered close eastward of Île Pavaria; it is the most important entrance to Rivière Ogooué, which it joins 8 miles south-eastward of Île Pavaria, *see* page 167.

Rivière Kondjo can be navigated by vessels with local knowledge drawing 6½ feet (2^{m}0), at all states of the tide, but its approach is rendered uncomfortable for river steamers by the heavy swell; the channel leading to the mouth of the river is marked by beacons.

Chart 604.

On the western side of the Ogooué, about 6 and 7 miles, respectively,

Chart 604.

from the junction of this river and Rivière Kondjo, are the entrances to Rivière Mandji and Rivière Nkomi which lead into Rivière Yombé.

Ngola is situated about 10 miles above the junction of the Ogooué and Rivière Kondjo, and the effect of the tide is felt there even during the dry season. There is a custom-house at Ngola (*Lat. 0° 58′ S., Long. 9° 03′ E.*), and pilots can be obtained there.

Falaba, near which is the entrance to the Nombi channel, *see* page 174, is situated on the right bank of the river about 4 miles above Ngola. At a short distance below Falaba, and on the southern side of the river, is a small channel leading to the Unoko channel, *see* page 174. At the junction of this channel with the Ogooué, the telegraph line from Port Gentil crosses the river. At Falaba vessels can go alongside the river bank without much difficulty. About 5 miles above Falaba is the junction with Nango-Nangué channel, *see* page 174.

For continuation *see* the description of Moyen Ogooué, page 174.

Chart 604, plan of Baie du Cap Lopez.

Rivière Yombé, the entrance to which is situated about 5 miles eastward of Pointe Akosso, *see* page 169, is the most frequented of those leading to the Ogooué; it is the most direct route from Port Gentil to that river, and vessels can reach it without exposure to the swell, but it cannot be navigated at all states of the tide, except by vessels drawing less than 3½ feet ($1^{m}0$). In addition, there is only one beacon to mark the channel, which is insufficient to ensure a vessel being able to follow its windings, and it is safer, therefore, to await the rise of the tide.

A light is exhibited from a framework structure, about 30 feet ($9^{m}1$) in height, situated on the western side of the entrance to Rivière Yombé, in a position about 5¼ miles east-south-eastward of Pointe Akosso.

Chart 604.

About 12 miles above the river entrance is the village of Niolokoué, above which are the entrances, firstly to Amboki channel, then to a small arm leading to Mandji channel, and finally to Mandji channel, itself, which last is about 4½ miles above that of Igoué channel and is often used by river steamers to pass from Rivière Yombé to the Ogooué.

On the eastern bank, about 2 miles above the entrance to Mandji channel and just below an islet, is the mouth of N'Komi channel which is an easy route for passing from Rivière Yombé to the Ogooué. During the in-going stream, it is necessary to beware of a strong current which sets northward out of the mouth of Unoko channel, *see* page 174, on the southern side of N'Komi channel.

A short distance further up the Rivière Yombé is the junction of Rivière Yombé and Rivière Animba with Affogozzo channel.

Rivière Oranga (Oronga) enters the head of Baie du Cap Lopez. In consequence of the rollers which are experienced off the entrances to Rivière Kondjo and Rivière Yombé, small craft find it advantageous to keep in the shelter of the land and enter by Rivière Oronga, passing into Rivière Yombé by N'Dogou channel (*Lat. 0° 51′ S., Long. 8° 54′ E.*).

Rivière Animba.—The mouth of this branch of the Ogooué, which is also known as Rio Mexias, is situated on the coast, *see* page 176,

Chart 604.

about 25 miles south-south-eastward of Cap Lopez, but it is not available as an entrance; it is formed between the southern end of Île Lopez, *see* page 167, and a long narrow tongue of sand, which runs parallel with that island, and at a distance of barely half a mile from it, for about 6 miles. This tongue as well as the banks in its vicinity, is continually changing.

At a short distance within the entrance and on the southern side of the river, is the main entrance to the N'Gouessi channel, which branch is easily available to river steamers, and leads to the Nango-Nangué channel, and is also connected by Rivières Ogololé and M'Polounié to Lagune N'Komi, *see* page 175. The second mouth of N'Gouessi channel is situated between two islets further up the Animba river, and still further up is the junction of the Rivière Animba and Rivière Yombé with Affogozzo channel.

Affogozzo and Nango-Nangué channels.—These are the two names of what is in reality one branch of the delta of the Ogooué; the route through this branch, though a little longer than those through the Mandji or N'Komi channels, forms an easy passage from Rivière Yombé into the Ogooué which can be used either by day or at night.

Owenga (*Lat. 1° 00′ S., Long. 8° 57′ E.*), near which are two fairly important native villages, is situated on the southern bank of the Affogozzo channel at a short distance within its mouth. Abreast these villages, there is a long islet, between which and the northern bank of the channel is a narrow passage leading through the Ouzougounzola channel to Rivière Yombé.

Bono and Aréowonga channels are two arms on the southern side of the Affogozzo channel both of which connect with N'Gouessi channel. Aréowonga channel is easily accessible to river steamers; the current in it is reversed at low river.

Further up the Affogozzo channel there are three long islets, and about 8 miles from its mouth it is joined by the Nombi and N'Gouessi channels.

Nombi channel is connected to the N'Komi channel by Unoko channel, but there is no through passage on account of the telegraph line which crosses the latter and some shoals which obstruct the Nombi near its junction with the Ogooué.

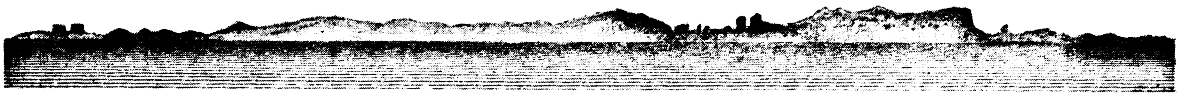
Above its junction with the Nombi and N'Gouessi channels, the Affogozzo is known as the Nango-Nangué; it joins the Ogooué near Île Buiti about 5 miles above Falaba, *see* page 173.

Charts 1361, 604.

Moyen Ogooué.—In this part of the river the shoals occasionally shift, and there are many snags. Between the junction of Nango-Nangué channel with the Ogooué and Lambaréné, situated nearly 70 miles east-north-eastward, the Moyen Ogooué forms a veritable labyrinth of rivers and lakes. A number of lakes are connected to the main branch of the river, of which four, Lac Onangé, Lac Evaro, Lac Ezanga and Lac Ogemwé (Ogemué), all communicating with one another, form a large basin extending nearly 20 miles southward. Two rivers, named Ambila and Akambé, lead from the Ogooué to this basin, and are used as a by-pass when the river is low, on account of the banks which encumber the main stream in the vicinity of N'Gomo (*Lat. 0° 51′ S., Long. 9° 59′ E.*), at which place there is a mission station.

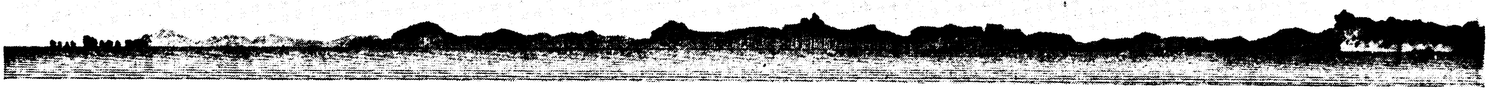
Charts 594, 1013, 2202a, 2203, 2127.

To face page 174.



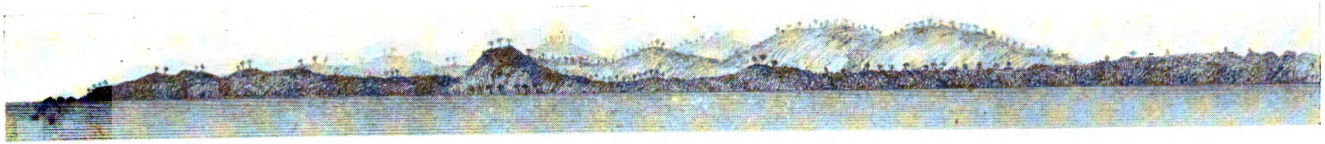
Cap Lopez promontory from northward.
(*Original dated* 1870.)

Pointe Sainte Catherine from north-westward.
(*Original dated* 1871.)



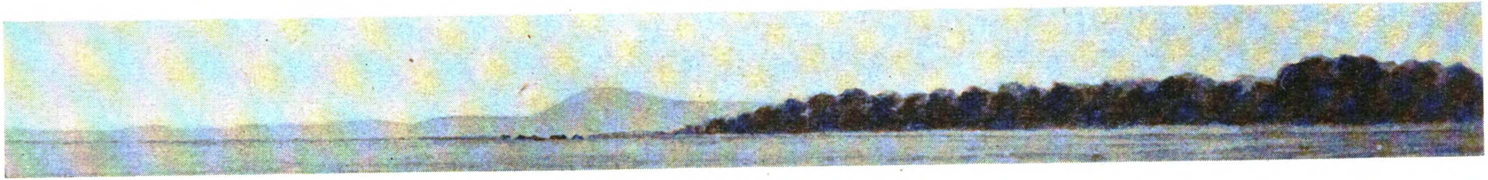
Coast in the vicinity of Setté Cama..
(*Original dated* 1871.)

To face page 175.



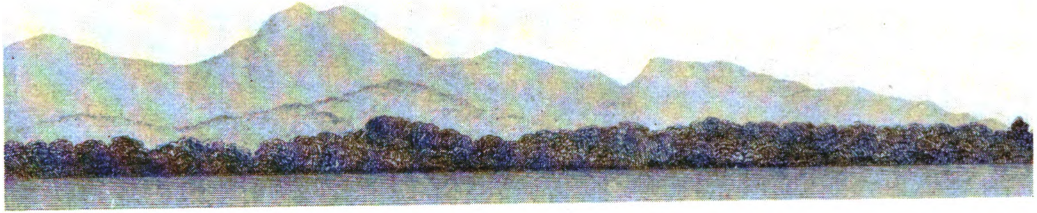
Pointe Panga, bearing 033°,
distant 2 *miles.*

Pointe Panga from south-westward.
(*Original dated* 1871.)



Pointe Matouti, bearing 350°,
distant 5 *miles.*

Baie de Mayumba.
(*Original dated* 1812.)



Les Mamelles.

Les Mamelles de Banda.
(*Original dated* 1871.)

Charts 1361, 604.

At a short distance above Enyonga (*Lat. 1° 00' S., Long. 9° 23' E.*) is the mouth of Rivière Oréga, a branch of the Ogooué, which flows from Lambaréné, northward of the main river. About 14 miles from its mouth, where it is again connected with Ogooué by Rivière Akaloa, it becomes known by the name of Rivière Oronga or Vinué. A series of lakes lie northward of this river, and are connected to it by small creeks. They are called, in the order in which they lie, from the south-westward, Lac Ivandé, Lac Nyogo, Lac Gômè, Lac Lôgé, Lac Ntyonié, Lac Igulwé, Lac Nkové, Lac Mômbwé and Lac Azingo. The latter can be reached by a small vessel, but these backwaters are not navigated by the river steamers.

A creek connects Lac Azingo with Mandji on Rivière Ramboë, *see* page 163.

Above Lac Lôgé (*Lat. 0° 43' S., Long. 9° 49' E.*) Rivière Oronga becomes known as Orembo Wango or Petite Rivière, and connects with Ogooué again at Lambaréné.

Lambaréné is a fairly important centre, at which is the seat of the Administrator in charge of the whole ot Bas Ogooué ; all the important factories have establishments there, and there are also a mission station and a hospital.

At a short distance above Yombé (*Lat. 1° 01' S., Long. 9° 28' E.*) is the mouth of Rivière Obando. After receiving the waters of Lac Anengé, this river divides into several branches, of which Rivière Ogololé connects with N'Gouessi channel, and Rivière Agoulé with Lagune N'Komi. This last branch is easily navigable at all times for vessels drawing up to 4 feet (1^{m}2), and it is through it that communication is maintained with the settlement at Fernan Vaz.

Haut Ogooué.—Above Lambaréné, navigation in the upper reaches of the Ogooué becomes very difficult on account of shifting sandbanks and the violence of the current. The banks of the river are densely populated and the natives do a considerable trade. There is a mission station at Samkita, about 25 miles above Lambaréné, and another at N'Djolé about the same distance further up the river.

N'Djolé is the old commercial, administrative and military centre of Ogooué, where in addition to the mission there are some small factories and a number of buildings. Above N'Djolé navigation is only possible by canoe on account of rapids.

Rivière N'Gounié joins Ogooué about 3 miles above Lambaréné. There are some dangerous rocks at the entrance, but the river is navigable during the wet season by well-found vessels drawing up to 8 feet (2^{m}4). The navigable length of Rivière N'Gounié, that is as far south as the Samba falls, is between 40 and 50 miles.

Chart 604.

Lagune N'Komi.—This lake, also known as Lagune de Fernan Vaz, is a large and easily navigable stretch of water, into the northern end of which flows several mouths of the Ogooué : the mouth of Rivière Agoulé is just behind an islet named Domé, and that of Rivière M'Polounié is near the southern end of Golfe d'Olindé. The northern end of the lagoon consists of a narrow channel, but southward it opens out into several arms in which are other islands.

Northward of the lagoon is the Golfe d'Olindé, having two openings to the sea, northward and southward of a tongue of sand. These openings are closed to navigation by Barre de l'Arabe and Barre des

Charts 1013, 2202a, 2203, 2127.

Chart 604.

Portugais, respectively. At its southern end Golfe d'Olindé communicates with Lagune de Fernan Vaz.

There is a residency at Fernan Vaz, near Pointe Boumboué (*Lat. 1° 35′ S., Long. 9° 16′ E.*); and a mission station at the mouth of Crique M'Pivié, situated about 10 miles south-eastward; a river flows into the head of this creek.

When the height of the waters permits, the river steamers of the Ogooué visit Fernan Vaz monthly. Small craft can proceed from Port Gentil to Fernan Vaz through the sheltered waters of Rivière Oranga, the N'Dogou channel, Rivière Yombé and Rivière Animba, the Ouzougounzola, Affogozzo, and N'Gouessi channels, and Rivière Ogololé and Rivière M'Polounié.

CAP LOPEZ TO RIVIÈRE MASSABI.—Currents.—Between Cap Lopez (*Lat. 0° 38′ S., Long. 8° 42′ E.*) and the mouth of the Congo, about 390 miles south-eastward, the current generally sets steadily in a north-westerly or north-north-westerly direction sometimes reaching a rate of about 2 knots. This current is the resultant of the Benguela or South African current augmented by the stream which flows out of the Congo, known as the Congo stream, which joins the former southward of Ponta da Moita Sêca (page 195), the southern entrance point of that river. These united currents turn westward off Cap Lopez and become part of the South Equatorial current.

The north-going current is usually more rapid close to the coast than it is in the offing, but its direction inshore is largely influenced by the formation of the land, while its rate there is variable owing to the effect of the winds. During steady winds from a northerly quarter, which are rare, the direction of the current is sometimes reversed.

Aspect.—From Cap Lopez, *see* page 167, the coast, which has been but imperfectly surveyed, trends south-south-eastward, without any off-lying dangers, for about 82 miles to Pointe Sainte Catherine; depths of 5 and 7 fathoms ($9^{m}1$ and $12^{m}8$) will be found at a distance of about 2 miles offshore along the whole of this part of the coast, and depths of 100 fathoms ($182^{m}9$) lie about 30 miles offshore. In depths below 55 fathoms ($100^{m}6$) the bottom is generally sand, over that depth it is mud. A narrow beach of sand extends the length of this coast, and on it a heavy surf breaks, particularly during the dry season, making landing in ships' boats impossible, except in a few places, and then only on exceptionally fine days.

Between Cap Lopez and Pointe Komandji, situated about 34 miles south-eastward of Pointe Sainte Catherine, the coast is sparsely populated; as far as Fernan Vaz it is uniformly thickly wooded, but further south large patches of bare ground alternate with thick jungle.

Coast.—At about 25 miles south-south-eastward of Cap Lopez is the mouth of Rivière Animba, *see* page 173; and 16 miles further south-south-eastward are Barre de l'Arabe and Barre des Portugais, closing the entrances to Golfe d'Olindé, *see* page 175.

During the wet season, Lagune de Fernan Vaz and also Rivière Animba discharge huge quantities of fresh water, which extend 4 or 5 miles seaward of the coast; at times the rising tide is unable to reverse these out-going streams of fresh water.

Charts 1013, 2202a, 2203, 2127.

Chart 604.

The sand forming the tongue between Barre de l'Arabe and Barre des Portugais is always shifting, and the sea breaks right across the entrances.

Anchorages.—Anchorage may be obtained by vessels with local knowledge, off the mouth of Rivière Animba, but care must be taken to avoid a spit which extends from the southern entrance point.

Anchorage may also be obtained, by vessels with local knowledge, about 3 miles southward of the mouths of the lagoon, northward of the village of Olindé (*Lat. 1° 19′ S., Long. 9° 01′ E.*), in depths of 6 or 7 fathoms (11^{m}0 or 12^{m}8), about 2 miles from the coast. This anchorage is out of the current but is only used by a few vessels which go there to load timber.

Coast.—Pointe Guéga, situated about 5 miles northward of Pointe Sainte Catherine, is fringed with rocks.

Pointe Sainte Catherine is only a slight projection on the coastline and has a reef extending northward from it, on which the sea breaks heavily. When navigating along this part of the coast, it should not be approached within a distance of about 4 miles.

From northward, the cape appears as an isolated clump of tall trees resembling an island; but from southward the coast appears craggy, *see* view facing page 174. Some small hills, situated southward of the cape give it a bold appearance. Behind the beach the land rises gently, and here and there are clearings.

At Pointe Sainte Catherine is the mouth of Lagune D'Iguela or N'Gobé (Lake N'Gové or Bangue), in the southern end of which is the mouth of Rivière Rembo N'Gobé. The lagoon is divided into two basins; the northern and smaller basin is encumbered with islets, and both are navigable by vessels drawing up to 3 feet (0^{m}9).

There are numerous villages on the shores of the lagoon. The tidal streams in the lagoon are very feeble. Although Rivière Rembo N'Gobé has been ascended for a distance of about 15 miles, it and its tributaries are encumbered with weeds.

Iguela.—Anchorage.—Beacons.—On the narrow spit of land between the channel separating the two basins and the sea, is the village of Iguela, which is built on the slope of a hill, and may be identified by a light grey tower, which stands close northward of a long house. There is a Customs house and Post office at Iguela.

Anchorage may be obtained, in 5 fathoms (9^{m}1), by vessels with local knowledge, about 1½ miles offshore, south-westward of the old light-structure, a grey iron column, at Iguela: the flagstaffs of the factories at that place can be seen from this anchorage, over the tops of the trees.

Two beacons, each surmounted by a square, in line bearing 051°, lead towards the anchorage clear of dangers; the front beacon is situated close eastward of the old light-structure.

Coast.—Depths.—Pointe Komandji, or Setté, is situated about 34 miles south-eastward of Pointe Sainte Catherine, and between them the coast recedes slightly and its aspect becomes more varied. In places there is a narrow beach, and in others trees grow down to the water's edge; in the southern part of this stretch, the beach reappears and the mouths of a few streams are indicated by narrow gaps in the trees. Inland, the country is more elevated and a few hills form a chain running parallel with the seaboard.

In fine weather the bottom can be seen from aloft at a very great

Charts 1013, 2202a, 2203, 2127.

Chart 604.

depth, between 13 and 20 miles from the coast. Depths of 100 fathoms ($182^{m}9$) run at a distance of from 27 to 37 miles from the coast, and two depths of 10 fathoms ($18^{m}3$) are reported to exist about 16 miles north-westward, and 14 miles westward, respectively, from Pointe Komandji.

Surf breaks heavily along the whole of this coast, except in a few places where landing might be effected in fine weather.

Pointe Komandji (*Lat. 2° 20′ S., Long. 9° 35′ E.*) is rounded and difficult of recognition from westward; at 3 miles southward of it, however, are some large green patches which help to distinguish the locality; these patches are situated at the extremity of a rounded point named Pointe de Gac, which stands out when seen from the anchorage at Setté Cama.

The neighbouring coast is slightly elevated, and is covered with brushwood, through which wind several streams, whose large mouths form a succession of lagoons and marshes. Rocks, which dry, fringe the coast and render approach to it dangerous; in addition, the sea breaks at a distance of about one mile offshore. There are some villages between Pointe Komandji and two small points named Magamba and Milango, about 4 miles south-south-eastward.

Setté Cama.—About 9 miles south-eastward of Pointe Komandji, is the entrance to Lagune N'Dogo, a large stretch of water, interspersed with many islets, and extending about 23 miles east-south-eastward. Lagune Sounga and Lagune Simba are two small lagoons which have a common entrance to the channel about 4½ miles from the mouth. Entry into the lagoons can only be effected by canoe, sharks abound, and at high water a heavy sea runs in the entrance.

Chart 604, plan of Setté Cama.

Setté Cama (*Lat. 2° 32′ S., Long. 9° 46′ E.*) is situated about 15 miles south-eastward of Pointe Komandji, and is at the root of the tongue of land which separates the channel to Lagune N'Dogo and the sea. It is the seat of an Administrator; there is also a factory with a flagstaff. Communication with the factory can be maintained by the International Code of Signals. There is a telegraph office and a Customs house here.

Dangers.—Two sandbanks, the presence of which is always indicated by breakers, lie, one northward and the other southward of the anchorage. The passage between these banks, leading to the anchorage for vessels drawing less than 19 feet ($5^{m}5$), is about 4 cables in width.

At about one mile southward of the anchorage, lying one mile from the coast and south-westward of a large clump of trees, is a shoal on which the depths decrease suddenly from 4 fathoms ($7^{m}5$) to 2½ fathoms ($4^{m}6$), sand. Vessels approaching the anchorage from southward, should avoid this shoal by keeping at least 2 miles from the coast, until the leading beacons are in line.

Light.—**Beacons.**—A light is exhibited, at an elevation of 37 feet ($11^{m}3$), from a white masonry column, erected on the beach near the centre of the village of Setté Cama (*Lat. 2° 32′ S., Long. 9° 46′ E.*). This light was reported extinguished in 1949.

Two white beacons, the front a wooden pyramid surmounted by a square, and the rear a wooden pylon, when in line bearing 055°, indicate the passage between the two sandbanks fronting the anchorage.

Charts 1013, 2202a, 2203, 2127.

Chart 604, plan of Setté Cama.

Anchorage.—Directions.—A vessel approaching the anchorage should keep the front beacon open a little northward of the rear beacon. A large vessel should anchor on this alignment in a depth of about 6 fathoms ($11^{m}0$), but a smaller vessel may proceed between the sandbanks and anchor about half a mile from the shore in a depth of about 3¾ fathoms ($6^{m}9$). There is usually a heavy swell at the anchorage, the bottom is very uneven, and, when swinging to the tidal stream, the cable is often caught in the rocky bottom. Landing is very difficult, and should not be attempted in ships' boats.

Chart 604.

Coast.—From Setté Cama, the land trends south-eastward for about 78 miles to Pointe Matouti, the south-western entrance-point of Baie de Mayumba, the intervening coast being low and wooded, with high flat ranges inland. Southward of Setté Cama is the northern end of a range of coastal hills, known as Santo Espirito, which forms the best mark by which to identify either Setté Cama or Pointe Pedras (*Lat. 2° 40′ S., Long. 9° 53′ E.*), situated about 12 miles southward of it, *see* view facing page 174.

Southward of Santo Espirito hills are several of the large clearings which give to the land a cultivated appearance. The coast is sparsely populated; but here and there a few fishermen's huts are just visible. This part of the coast should not be approached within depths of 8 or 9 fathoms ($14^{m}6$ or $16^{m}5$), which will be found about 3 miles offshore, as it is strewn with rocks, of which a large number are pinnacles.

Depths of 100 fathoms ($182^{m}9$) run parallel with the coast and about 35 miles off it, and the regularity of the soundings is of great assistance during the months of June, July, and August when fog may envelop the land.

Current.—A current of about one knot may be expected to set northward along this coast; at rare and uncertain intervals this current has been known to run in the opposite direction for one or two days.

Coast.—Pointe Pedras projects about one mile from the line of coast, and shows up when approaching from southward; on it are several isolated sandhills sloping southward to the banks of Rivière Massetché. Rocks, some of which dry, extend about 2 miles south-westward from the point, and a 2-fathom ($3^{m}7$) patch lies about 3½ miles south-westward of the point. Vessels wishing to anchor in the vicinity of Pointe Pedras may avoid these rocks by keeping in a depth of not less than 10 or 11 fathoms ($18^{m}3$ or $20^{m}1$), sand, which will be found at a distance of about 7 miles offshore.

The mouth of Rivière Massetché is only about 40 yards ($36^{m}6$) wide, that of Lagune Vévy is situated about 8 miles south-eastward of Pointe Pedras, with that of Lagune Badingo close southward of it; these last two entrances are difficult to distinguish.

Lagune Badingo extends south-eastward of its mouth, and parallel with the coast, for about 10 miles, being separated from the sea by a very narrow tongue of sand; near its mouth is the village of Yendji.

The mouth of Rivière Nyanga is situated about 27 miles south-eastward of Pointe Pedras, but for the last 4 miles the river runs parallel to the coast behind a narrow spit of sand. In 1891, the entrance was about one cable wide, with a large shallow bar and strong currents. Within are said to be depths of 23 feet ($7^{m}0$), for about 16 miles up-

Charts 1013, 2202a, 2203, 2127.

Chart 604.

stream, or as far as some rapids, but the river is encumbered with snags and its banks are often submerged. A heavy sea runs on the bar, and there is considerable risk of capsizing when crossing it.

The settlement of Nyanga, in which there is a telegraph office, is situated on the tongue of sand about 4 miles southward of the mouth of the river; in the vicinity of the settlement are several factories and two villages.

Pointe Panga (*Lat. 3° 16′ S., Long. 10° 33′ E.*), is situated about 23 miles south-eastward of Nyanga, the intervening coast being regular and featureless; this stretch is a sandy beach, the land within being marshy and covered with brush, but towards the point it becomes gradually more elevated. The point itself, when viewed from northward, presents three or four saddle-shaped summits, and a remarkable dark red cliff, surmounted by dense woods, forms one of the most conspicuous objects on this part of the coast, and cannot be mistaken; several huts exist northward of the point.

These hills and cliff are first high land which borders the sea which is seen when coming from northward. Under the point there is a rock or islet, and a reef of rocks extends one mile south-westward; close southward of the point there is a cove in which landing is practicable, *see* view facing page 175.

Chart 604, with plan of Baie de Mayumba.

Baie de Mayumba.—This bay is entered between Pointe Panga and Pointe Matouti, about 12 miles south-south-eastward; it has a fine sandy beach, and wooded hills, highest in the southern part, rise behind its shore, *see* view facing page 175.

Southward of Baie de Mayumba the vegetation becomes less vigorous, arid plains and bare hills appear, and these evidences of more or less persistent drought become more pronounced on advancing southward.

Pointe Matouti consists of several hills sloping towards the sea, and terminating in a low point on which are some huts; it is fronted for a distance of about 2 cables by a reef of rocks, some of which dry.

Further offshore there is a reef on which are two islets, which just show above water, situated about 6 cables north-westward of the point; the passage between them and the point is reported to be impracticable.

Eastward of Pointe Matouti, conspicuous from north-westward but invisible from southward, are some European houses on a hill. The Resident's house, with its flagstaff and the road leading to it, situated about 2 miles north-north-eastward of Pointe Matouti, can be seen for some distance.

At the settlement there is a telegraph office and some factories. The bay abounds with fish and oysters.

Climatic table; *see* page 73.

Light.—A light is exhibited, at an elevation of 33 feet ($10^{m}1$), from a black wooden pylon with white bands, about 26 feet ($7^{m}9$) in height, on Pointe Matouti (*Lat. 3° 27′ S., Long. 10° 39′ E.*). This light was reported extinguished in 1949.

Anchorages. — There is good anchorage in a depth of about 6 fathoms ($11^{m}0$) with Pointe Matouti light-structure bearing 180° distant 9½ cables. This position is about 4 cables from the north-eastern islet and the same distance from the shore. Small vessels may anchor further in, according to draught.

Charts 1013, 2202a, 2203, 2127.

Chart 604, with plan of Baie de Mayumba.

There is another anchorage, in depths of 8 to 10 fathoms ($14^{m}6$ to $18^{m}3$), over brown sand, with the Residency bearing 080°, distant 1·1 miles.

A third anchorage is further northward, west-north-westward of the Residency, in a depth of 6½ fathoms ($11^{m}9$), about 6 cables from the shore.

The bay affords good shelter from southerly and south-south-easterly winds, but it is exposed to south-westerly winds; in the first of the above anchorages, the reef breaks the sea and lessens the effect of the swell.

Landing from ships' boats can occasionally be effected, but it is very risky and surf-boats are always available.

Chart 604.

Coast.—The coast from Pointe Matouti to Pointe Banda trends south-eastward for about 30 miles; it consists of a sandy beach backed by forest, and inshore the land rises in three ranges of hills. Depths of from 15 to 20 fathoms ($27^{m}4$ to $36^{m}6$), fine sand, will be found from 3 to 4 miles offshore, and depths of 100 fathoms ($182^{m}9$) run parallel with the coast and about 35 miles off it.

Lagune M'Banio is situated nearly parallel with the coast, between 16 and 37 miles south-eastward of Baie de Mayumba. It is connected to the sea by Rivière Mayumba, which flows from its northern end parallel to, and at a short distance from, the coast and enters Baie de Mayumba about 4 miles northward of Pointe Matouti.

The mouth of the river is about 3 cables wide, and is encumbered with sandbanks on which there is a depth of only about 5 feet ($1^{m}5$), so the entrance is not always passable for boats. The river is an excellent place in which to haul the seine.

At about 5 miles south-eastward of Pointe Matouti, and about a quarter of a cable offshore, is Rocher Noire, a black rock about 5 feet ($1^{m}5$) high; 3 miles further south-eastward is a black islet or large rock, named Roche Massanga, which lies about 2 cables from the coast. These two rocks are on a bank which fringes the coast and extends about half a mile offshore.

Pointe Banda (*Lat. 3° 49′ S., Long. 11° 00′ E.*) is low, round, and difficult to distinguish, though its position may be identified by two paps inland, which are known as Les Mamelles de Banda, *see* view facing page 175.

In the foreground is Colline Table, about 247 feet ($75^{m}0$) high, on which is a prominent wood of coconut palms, and near which is a village; on the coast about 1½ miles south-south-eastward of Pointe Banda is the village of Sainte Marie, built on a hill about 66 feet ($20^{m}1$) high.

Anchorage.—Anchorage may be found, by vessels with local knowledge, in Baie de Banda, on the northern side of Pointe Banda, in depths of 6 fathoms ($11^{m}0$), mud, and good holding ground. This anchorage is sheltered from the prevailing winds, and also from the effect of the swell by Banc de l'Antelope, over which the least depth is 22 feet ($6^{m}7$), and which lies about 2 miles south-south-westward of Pointe Banda.

Coast.—Pointe Tshibobo, situated about 3 miles south-south-eastward of Pointe Banda, is surmounted by a rounded hill.

The coast south-eastward, as far as Baie de Lékondé, a distance of

Charts 1013, 2202a, 2203, 2127.

Chart 604.

about 27 miles, is fronted by a coastal bank with depths of less than 5 fathoms (9ᵐ1), which extends as much as 2 miles offshore in places, also several shoals close inshore do not break even in fine weather, and render navigation dangerous close to the coast.

This coast affords no shelter, but is more populated than the shores of Baie de Mayumba. It is moderately high, and rises from a thick belt of trees to one or two ranges of hills, which are less elevated than those further northward. It is interrupted by the mouths of several rivers, of which the most important are the M'bia, Niafessa, Mekoundgi, Concouati, and Numbi, situated 2, 5, 10½, 15, and 25 miles, respectively, south-eastward of Pointe Tshibobo; the first four are openings into lakes of the same name, which lie close within the coast.

A very heavy surf breaks at a distance of about 3½ cables from the mouth of Rivière Concouati, the entrance to which is in Lat. 4° 00′ S., and is about 50 yards (45ᵐ7) wide. The village of Concouati is connected to the telegraph system, and is situated on a tongue of sand at the mouth of the river. An important trade in timber is carried on here.

Dangers.—Banc Saint Paul lies near the outer edge of the coastal bank, about 2½ miles south-south-eastward of the mouth of Rivière Niafessa, with depths over it of 2½ fathoms (4ᵐ6); another shoal, with the same depth over it, lies about 4½ miles westward of the mouth of Rivière Mekoundgi, but its exact position has not been determined. A 3½-fathom (6ᵐ4) rocky patch lies about 5½ miles south-eastward of the mouth of Rivière Mekoundgi, and about 2 miles offshore.

Banc de Haoussa (Haussa), situated in the approach to Baie de Lékondé, about 3½ miles westward of the mouth of Rivière Numbi, has a least depth of about 4¾ fathoms (8ᵐ7).

Banc du Prométhée (Prometheus) also lies on the coastal bank, which extends as much as 3½ miles off the coast between Pointe Lékondé and Pointe Tchitembo (*Lat. 4° 11′ S., Long. 11° 23′ E.*), situated, respectively, 3¾ and 4½ miles south-south-eastward of the mouth of Rivière Numbi. It has a least depth of 8 feet (2ᵐ4) over it, in a position 1½ miles westward of Pointe Lékondé. In the fairway between Banc du Prométhée and the coast eastward, there is a least depth of 19 feet (5ᵐ8), but it is obstructed by a 12 foot (3ᵐ7) shoal, situated about 7 cables west-south-westward of Pointe Lékondé.

Banc du Prométhée does not break in calm weather.

Baie de Lékondé.—This bay, which can only be entered by vessels of light draught with local knowledge, is a slight indentation extending from the mouth of Rivière Numbi to Pointe Tchitembo; close northward of this latter point is a small hill, with a flat summit. Rocks which dry fringe Pointe Lékondé and Pointe Tchitembo.

A heavy swell sometimes sets in and landing is often very difficult on account of the surf.

The mouth of Rivière Numbi, whose black waters flow into the northern end of the bay, is very narrow and encumbered with black rocks; on the eastern side, near its mouth, is the settlement of Madingo, where there is an Administrator, and a Post office. At one mile northward of the entrance is a remarkable, steep, red cliff known as Tindjili. The foot of this cliff, against which the sea breaks, is fringed with round black rocks.

Coast.—Pointe Kounda is rounded, and is situated about 1½ miles

Charts 1013, 2202a, 2203, 2127.

Chart 604.

southward of Pointe Tchitembo ; off it the depths are irregular, rocks abound, and the presence of shoal banks is probable.

From Pointe Kounda the coast trends regularly south-eastward for about 22 miles to the mouth of Rivière Kouilou ; it consists of a sandy beach behind which stretches the forest, through which several streams flow into the sea, and small land-locked lagoons lie at a short distance inland.

Behind the forest there is a line of low bare hills, broken at one place by a river near which is Longobonda (*Lat. 4° 18′ S., Long. 11° 31′ E.*), situated about 10 miles south-eastward of Pointe Kounda, which may be identified by a prominent white house. This part of the coast is not safe, as the sandy bottom is strewn with rocks, and should not be approached within a depth of 9 fathoms (16^{m}5).

Southward of Longobonda, the coast as far as Rivière Kouilou is composed of dunes, which appear white from seaward, and on which are a few palm trees ; the hills cease abruptly at a short distance northward of the mouth of Rivière Kouilou.

The position of the mouth of the Rivière Kouilou is marked by two white European houses which show up well against the green background. The entrance to the river is encumbered with shifting sandbanks on which the sea breaks heavily ; the bar has a bad reputation. During the dry season the entrance is dangerous on account of the constant, heavy, south-westerly swell which breaks right across it.

The depths decrease regularly towards the bar, on which there is a depth of about 10 feet (3^{m}0) ; within the river, abreast the custom-house, depths of from 13 to 20 feet (4^{m}0 to 6^{m}1) have been found. Rivière Kouilou is an important river, but is obstructed by rapids ; there are several factories on the southern bank, near its mouth. Sea-going vessels anchor off the river, but the working of cargo is often suspended on account of the wind and swell, or by the state of the bar. The muddy waters of the river may be seen far offshore, and give the appearance of shoal water. The out-going stream on the falling tide from the river sets to the north-westward off the entrance, strongly so when close inshore.

South-eastward of Rivière Kouilou, the land rises gently towards Loango (*Lat. 4° 39′ S., Long. 11° 49′ E.*), a distance of about 15 miles : the action of the rains has scored the flanks of the hills into conspicuous ravines, the bright red colour of which is extremely remarkable. A gently shelving sandy beach, on which the sea usually breaks in one long line of rollers, forms the coast-line.

Off-lying bank.—Banc du Mulet is a narrow shoal ridge of hard sand and rock, about 16 miles in length within depths of 10 fathoms (18^{m}3) ; it lies parallel with the coast with its seaward limit about 6 miles offshore. The least known depth upon it, 4½ fathoms (8^{m}2), is situated near the centre of the bank, about 10 miles westward of the mouth of Rivière Kouilou and about 4 miles south-eastward of this position there is a depth of 4¾ fathoms (8^{m}7) ; the edges of the bank are steep-to.

Chart 1067.

Baie de Loango.—This bay extends south-south-eastward from the mouth of Rivière Kouilou to Pointe Indienne, a distance of about 15 miles.

The head of the bay, when seen at a distance of about 3 miles,

Chart 1067.

appears as a thick line of trees of uniform height surmounting the beach. Northward, and at a little distance inland, a flat-topped hill with precipitous shoulders shows above the tree-tops; southward, a continuous chain of hills decreases in elevation in that direction, *see* view facing page 190.

At a short distance southward of Baie de Loango are two groups of hills with bare summits; the vegetation on these hills grows in lines, and exactly reproduces the appearance of cultivated fields separated by hedges.

Pointe Indienne is low and wooded; inland it rises to some bare hills of a reddish hue surmounting low cliffs covered with vegetation.

The town of Loango (*Lat. 4° 39′ S., Long. 11° 49′ E.*) is a little nucleus of houses and factories built on two bluffs. At the foot of the bluffs on which the town is built is a small salt-water lagoon separated from the sea by a narrow bank of sand. The entrance to the lagoon is continually shifting and is sometimes closed altogether.

Loango was formerly an administrative centre and has a resident doctor, but no hospital; it is connected to the general telegraph system. There is occasional steamship communication with Europe. Supplies are scarce, though fish is abundant.

Climatic table.—*See* page 74.

Dangers.—A rocky spit, with uneven depths of less than 5 fathoms ($9^{m}1$), extends about 2¼ miles north-westward of Pointe Indienne; the least depth on the outer part is 13 feet ($4^{m}0$), about 1¼ miles from the point. No vessel should attempt to cross the spit, as the sea breaks violently across it. The Residency flagstaff, situated on a cliff about 2½ miles north-eastward of Pointe Indienne, bearing 111°, leads northward of this spit. The Residency may be seen close southward of this flagstaff.

A narrow sandy spit extends about 3 miles north-eastward from Pointe Indienne, enclosing a saltwater lagoon. North-westward of the spit a shelf, with depths of less than 3 fathoms ($5^{m}5$) over it, extends for a distance of between one-quarter and 1¼ miles.

Current.—A strong north-north-easterly current may be experienced off Pointe Indienne (*Lat. 4° 40′ S., Long. 11° 46′ E.*). During the rainy season a current setting westward towards the spit off Pointe Indienne has been found close inshore in the bay.

Anchorage.—A good position in which to anchor is in a depth of about 4¾ fathoms ($8^{m}7$), with the Residency flagstaff bearing 111°, and Pointe Indienne bearing about 190°; the holding ground is excellent, but it is necessary to veer plenty of cable to guard against the easterly squalls, which are sometimes very violent during the rainy season, which begins in October. It is also necessary to keep at least 10 feet ($3^{m}0$) under the bottom on account of the rollers.

During the above season it is not advisable to anchor further in, as a vessel dragging would then be in danger of drifting on to the spit off Pointe Indienne.

Landing is usually effected in surf-boats.

Baie de Pointe Noire.—This bay is entered between Pointe Indienne and Pointe Noire, about 8 miles south-south-eastward; the latter point is low and largely built over.

Southward of Pointe Indienne, the shore of the bay is fronted by a sandy beach, and, for about 2½ miles, flat rocks fringe the coast.

Charts 604, 1013, 2202a, 2203, 2127.

Chart 1067.

The sea, forming several lines of rollers, breaks in places at a considerable distance offshore, but the surf diminishes towards the southern part of the bay.

Between the hills inland and the coast, there is a wooded plain, and towards the middle of the shore of the bay is a clump of trees known as Bois de Loobo (Lubu). Rivière Loubinde (Lubinde) and Rivière Songolo flow into another long, narrow, and shallow lagoon on the eastern side of the bay; the mouth of this lagoon is situated about 2¾ miles north-north-eastward of Pointe Noire (*Lat. 4° 48′ S., Long. 11° 49′ E.*).

A white-washed pyramid stands on the southern side of the mouth of Rivière Songolo. The Titan crane on the outer breakwater is also a prominent mark.

The two metal masts of the radio station situated about 2¼ miles east-south-eastward of the light on the head of the outer breakwater, are also conspicuous.

There are several factories on the shore of the bay.

Current.—The current in the bay usually runs north-north-eastward, under the influence of the prevailing wind, at a rate of from one-quarter to half a knot; the tidal streams are weak.

Lights.—A light is exhibited, at an elevation of 91 feet ($27^{m}7$), from a black and white tower, about 43 feet ($13^{m}1$) in height, situated on the southern shore of the bay about one cable eastward of the root of the pier.

A light is exhibited, at an elevation of 20 feet ($6^{m}1$), from an iron pylon, about 13 feet ($4^{m}0$) in height, situated on the northern extremity of the outer breakwater.

A light is exhibited at an elevation of 26 feet ($7^{m}9$) from a white tower situated at the extremity of the spur of the west breakwater. This light is exhibited only when a vessel is expected.

A light is exhibited, at an elevation of 52 feet ($15^{m}8$), from a white tower with a red lantern situated on the extremity of the eastern breakwater.

A light is exhibited, at an elevation of 215 feet ($65^{m}5$), from each of the two conspicuous radio masts (*Lat. 4° 47′ S., Long. 11° 52′ E.*), situated about 2¼ miles east-south-eastward of the light on the head of the outer breakwater.

Dangers.—Conflict bank is a small rocky patch, over which there is a depth of 5½ fathoms ($10^{m}1$), and lies in the northern approach to Baie de Pointe Noire, about 2 miles offshore and 3½ miles south-south-westward of Pointe Indienne.

A chain of banks extends about 2 miles north-westward from Pointe Noire; the sea occasionally breaks on these banks.

Banc des Anglais, on which the least depth appears to be 7 fathoms ($12^{m}8$), rock, is the outermost of these banks.

Banc du Sagittaire, which extends from 12 to 15 cables from Pointe Noire, has a least depth over it of 5½ fathoms ($10^{m}1$), coral.

Banc de la Syzigie, lying from 7½ to 10 cables from Pointe Noire, has a least depth over it of 4¾ fathoms ($8^{m}7$), coral.

Banc de la Pointe, on which the depths are less than 3 fathoms ($5^{m}5$), extends about 5 cables from Pointe Noire.

Banc de l'Astrolabe is a narrow rocky shoal which lies parallel to the coast, with its shallowest part, over which there is a depth of

Charts 604, 1013, 2202a, 2203, 2127.

Chart 1067.

3 fathoms (5^{m}5), situated about 7 cables westward of the mouth of Rivière Songolo.

An isolated rocky patch, over which there is a depth of 5 fathoms (9^{m}1), lies about 2¼ cables westward of Banc de l'Astrolabe.

Banc Songolo, on which there appears to be a depth of 3¼ fathoms (5^{m}9), rock, lies about 7 cables south-westward of the mouth of Rivière Songolo.

Pilotage.—Pilotage is compulsory for all merchant vessels of more than 100 tons gross. The pilot generally embarks about half a mile northward of the entrance to the harbour.

Harbour.—Quays.—The outer breakwater, about one mile long, curves northward from Pointe Noire (*Lat. 4° 48′ S., Long. 11° 49′ E.*), and at about 3 cables from its northern end, the western breakwater extends for a distance of 2 cables in an easterly direction, with a depth of 33 feet (10^{m}1) alongside its southern side. From its head, the eastern breakwater, which is detached, extends for a distance of about 4 cables in an easterly direction and thence in a southerly direction for about the same distance. The harbour entrance, between the eastern and western breakwaters, is about 650 feet (198^{m}1) wide. On the eastern side of the outer breakwater is a quay with depths of 30 feet (9^{m}1) alongside. The port offices are situated at the southern end of the quay which is connected with the railway system.

There is also a quay for lighters at the southern end of the harbour, with a depth of 11 feet (3^{m}4) alongside.

A pier, with a depth alongside each side of its head of 9 to 13 feet (2^{m}7 to 4^{m}0), for a distance of about 344 feet (104^{m}8), extends from the shore westward of the easternmost lighthouse.

A mooring buoy is situated about one cable eastward of the head of the pier.

There is a small slipway about half a mile southward of the harbour entrance.

In rounding the head of the outer breakwater the swell forms rollers, especially between May and October. It is as well to pass more than 1½ cables off the head of the outer breakwater when entering the harbour.

In 1950, vessels of up to 30 feet (9^{m}1) draught, could be accommodated, and there was anchorage in the harbour, with swinging room, for one large vessel drawing 23 feet (7^{m}0).

There are two mooring buoys about a quarter of a mile northward of the outer breakwater head.

Anchorage.—Approaching the bay from northward, care must be taken to avoid Conflict bank, and from southward, the banks extending from Pointe Noire must be given a good berth. Good anchorage will be found with the northern radio mast bearing about 104° and the light-structure on the head of the eastern breakwater bearing about 206°.

This anchorage is comparable with that in Baie de Loango, *see* page 184, the rollers are heavy, but with 10 feet (3^{m}0) under the bottom there should be nothing to fear.

Signal station.—There is a signal station on the tower over the office of the Captain of the Port. Permanent watch is not kept.

Town.—Port facilities.—Pointe Noire (*Lat. 4° 47′ S., Long. 11° 50′ E.*) has been, since February 1950, the capital of Moyen Congo; *see* page 7. The population, in 1950, was about 17,000, of whom

Charts 604, 1013, 2202a, 2203, 2127.

Chart 1067.

1,500 were Europeans. There are a number of factories, some good hotels and a hospital.

The town is in course of development. There are a number of sawmills, and a coffee factory, and palm-oil production is an important local industry.

Bathing is not recommended due to the presence of sharks.

Water is available, both for drinking and for boilers, and is supplied by lighters of 50 tons capacity.

Fuel oil is available, by pipe-lines to each quay.

A small stock of coal is maintained by a private company.

Fresh provisions and fish may be obtained at certain seasons, but orders should be placed in advance.

There are a number of cranes, the largest of which is a floating crane of 120 tons capacity.

All the quays are connected to the railway system.

There are several tugs.

Repairs can be effected and there are large mechanical and woodwork workshops. Diving apparatus is available.

There is a slipway capable of lifting vessels up to 500 tons: *see* Appendix II.

A single-line railway connects Pointe-Noire with Brazzaville, the capital of French Equatorial Africa.

There is regular steamship communication with Europe, and with other African ports; and there is a frequent air service to all parts of the continent.

There is a radio station and the town is connected to the general telegraph and telephone system.

Chart 604.

Coast.—From Pointe Noire to Fausse Pointe Noire, a distance of about 5 miles, the coast trends south-south-eastward with a narrow beach, close behind which runs a ridge about 40 feet ($12^{m}2$) high. As the coast is exposed to the prevailing wind and the swell from the offing, the surf on it is very heavy.

A bank with a depth of 6 fathoms ($11^{m}0$) over it, the existence of which is doubtful, is indicated on the chart about 5 miles south-westward of Pointe Noire. H.M.S. *Conflict* passed over this position on several occasions between 1857 and 1859, without obtaining a less depth than 14 fathoms ($25^{m}6$).

Fausse Pointe Noire is rocky, and rises to a height of about 23 feet ($7^{m}0$), almost from the water's edge; care should be taken to avoid mistaking it for Pointe Noire. The mouth of Lagune M'Vassa is situated a short distance northward of the point.

From Fausse Pointe Noire (*Lat. 4° 53′ S., Long. 11° 53′ E.*), the coast trends south-eastward for about 12 miles to the mouth of Rivière Massabi, with few conspicuous marks.

Côte Matéva, at the mouth of a lagoon, is situated about 3 miles southward of Fausse Pointe Noire, and about 1½ miles further southward is the northern end of Lagune Malonda, which follows the coast for about 4 miles, and is connected to Rivière Loémé: the mouth of the lagoon is about 3 miles southward of Côte Matéva.

A rocky point is situated about 1½ miles southward of Côte Matéva, and rocks, over which there are depths of from 13 to 16 feet ($4^{m}0$ to $4^{m}9$), extend from it for over three-quarters of a mile.

Charts 1013, 2202a, 2203, 2127.

Chart 604.

The mouth of Rivière Malonda is situated about 1½ miles southward from the above point; in its approach the bottom changes rapidly from soft mud to clay, and from clay to shells; one mile north-westward the bottom is rocky.

Current.—Caution is necessary in this vicinity, as the prevailing current runs strongly north-westward.

Anchorage.—There is a factory about 3 miles southward of Rivière Malonda, off which there are depths of 4 and 9 fathoms ($7^{m}3$ and $16^{m}5$), at distances of about 350 and 1,650 yards ($320^{m}0$ and $1,508^{m}0$), respectively.

Vessels with local knowledge may find anchorage off the factory, in depths according to their draught and the state of the swell; the bottom is good holding ground of hard sand, but the surf is heavy.

Rivière Massabi.—The common mouth of Rivière Loémé and Rivière Massabi (Chissambo) is situated about 19 miles south-eastward of Pointe Noire (*Lat. 4° 48′ S., Long. 11° 49′ E.*); it is scarcely 200 feet ($61^{m}0$) wide, and the least depth in it is 1½ feet ($0^{m}5$). About 6 miles northward of its mouth, Rivière Loémé passes through Lagune Bafou or Kayo, where there is a French settlement.

Anchorage.—Anchorage may be found, by vessels with local knowledge, in a depth of about 5½ fathoms ($10^{m}1$), fairly good holding ground, with the flagstaff of the Dutch factory bearing about 056°, at a distance of about one mile offshore. The best place at which to land is abreast the boathouse for the bar canoes. Landing cannot be effected in ships' boats.

Charts 1013, 2202a, 2203, 2127.

CHAPTER V

RIVIÈRE MASSABI TO THE CONGO RIVER

CLIMATE AND WEATHER.—*See* page 55.

Chart 604.

RIVIÈRE MASSABI TO PONTA DA MOITA SÊCA.—Coast.—From the mouth of Rivière Massabi (*Lat. 5° 02′ S., Long. 12° 02′ E.*), the coast of the Portuguese enclave of Cabinda, which administratively is part of Angola, *see* page 9, trends south-south-eastward for about 30 miles into Baia de Cabinda, and thence about 12 miles in a south-south-westerly direction to Ponta N'gelo, on the northern side of the seaward end of the estuary of the Congo.

Depths of 100 fathoms (182^{m}9) lie at a distance of from 20 to 34 miles off this part of the coast.

The prevailing nature of the bottom near the coast, as far out as depths of 10 or 11 fathoms (18^{m}3 to 20^{m}1) is mud; farther out grey muddy sand, sand and gravel, and sand mixed with coral are found; this last is more general in the neighbourhood of the mouth of the Congo. It is only in a few places that the bottom is rocky.

Chart 604, plan of Baia de Landana.

The mouth of Rio Chiloango is situated about 8 miles south-south-eastward of that of Rivière Massabi, and the intervening coast rises to hills of moderate height. North hill, 318 feet (96^{m}9) high, and Chinchoxo hill, 239 feet (72^{m}8) high, are two hills situated about 2¾ and 1½ miles, respectively, north-north-westward of the mouth of Rio Chiloango and about 3 cables inland. The village of Chinchoxo is situated near the coast just southward of North hill.

The entrance to Rio Chiloango is indicated by red hills which fall steeply to the beach; off the river the sea is discoloured for a distance of about 7 miles, where depths of 17 and 19 fathoms (31^{m}1 and 34^{m}7) will be found.

Danger.—The French s.s. *Ville de Maceio* struck, in 1891, upon a shoal of sand and gravel, lying about 2 miles offshore westward of the village of Chinchoxo, but its exact position is doubtful. The least depth obtained over this danger, which must be avoided by vessels approaching Baia de Landana, was 13 feet (4^{m}0).

Rio Chiloango.—This river, though probably 100 miles in length, is but a narrow stream, and for the greater part of its course is only navigable by small steam launches. It rises in the Belgian Congo and flows south-westward until about 10 miles from its mouth it

Chart 604, plan of Baia de Landana.

turns north-westward. The bar at its mouth can be crossed by small vessels of light draught, but it is dangerous on account of the heavy surf.

Chart 604.

Dungo (Dungu) (*Lat. 4° 43′ S., Long. 12° 57′ E.*), on the left bank of Rio Chiloango and nearly at the limit of the navigable channel, is accessible to small vessels.

Chart 604, with plan of Baia de Landana.

Baia de Landana.—Caution.—According to determinations by the Portuguese Government in 1930, Baia de Landana is situated about 3½ miles farther southward than charted. The correct position is as given on the above plan.

Ponta de Landana is the most conspicuous headland on this part of the coast, and, projecting a considerable distance seaward, presents a bold and bluff appearance. It is situated about 3 miles southward of the mouth of Rio Chiloango, and the indentation in the coast northward of it is Baia de Landana. There is a depth of 2¾ fathoms (5$^{\mathrm{m}}$0) about one mile north-westward of the point.

Landana is one of the largest trading stations on this part of the coast. The Residency is a conspicuous white house with a flagstaff, erected on a bluff southward of the village, at an elevation of about 280 feet (85$^{\mathrm{m}}$3); there is also a mission station. Practically no supplies are available. Palm oil and kernels, rubber and ivory are exported, and the imports consist of cotton goods, groceries, tobacco, etc.

There is occasional steamship communication with Europe.

Light.—A light is exhibited, at an elevation of 151 feet (46$^{\mathrm{m}}$0), from a white square masonry tower, 26 feet (7$^{\mathrm{m}}$9) in height, on Ponta de Landana. *See* view facing this page.

Anchorage.—Anchorage may be had in a depth of 5 fathoms (9$^{\mathrm{m}}$1), mud, with a conspicuous tree near the Residency, situated about one mile northward of Ponta Landana, bearing 104°, and the summit of Chinchoxo hill, bearing 025°; or closer in according to draught. Inside depths of 4 fathoms (7$^{\mathrm{m}}$5), the bottom is rocky. Small vessels can anchor in a depth of 3 fathoms (5$^{\mathrm{m}}$5), off Dutch house, which latter is situated close northward of the Residency.

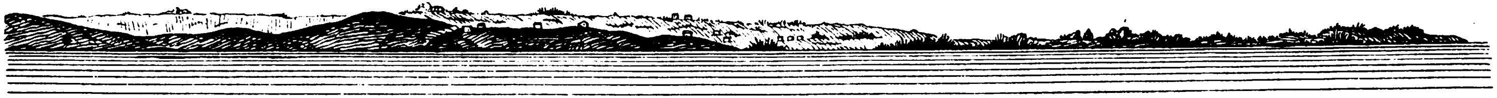
Landing is most difficult, often impossible, and surf-boats or canoes, which are sent out from the beach, should invariably be used.

Chart 604, plan of Baia de Malembo.

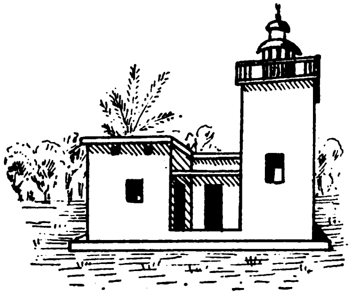
Baia de Malembo.—Ponta de Malembo, at the southern end of the bay of that name, is situated about 7 miles southward of Ponta de Landana; it consists of a grassy tongue of land extending north-north-westward from the base of some abrupt, red, chalky cliffs surmounted by vegetation, and here and there, by trees. These red cliffs, which line the coast northward and southward of the bay, assist in identifying it. A narrow shoal, with depths of 3 fathoms (5$^{\mathrm{m}}$5) or less over it, extends about 10½ cables north-westward from Ponta de Malembo.

Between Baia de Landana and Baie de Malembo, vessels should not approach the coast into depths of less than 6 fathoms (11$^{\mathrm{m}}$0).

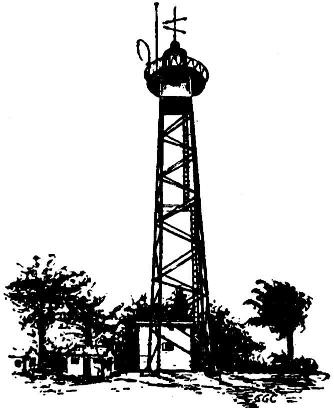
Baia de Malembo (*Lat. 5° 19′ S., Long. 12° 11′ E.*) is in form similar to all the small bays on the African coast southward of the equator; each recedes in a south-easterly direction and is protected on its


Factories.
Pointe Indienne, bearing 155°, *distant* 4 *miles.*

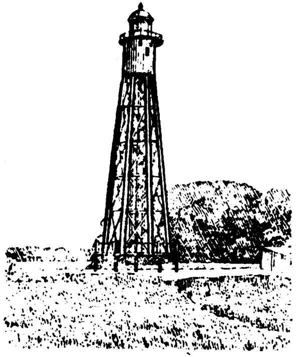
Baia de Loango from north-westward.



Ponta de Landana lighthouse.
(*Original dated* 1949.)

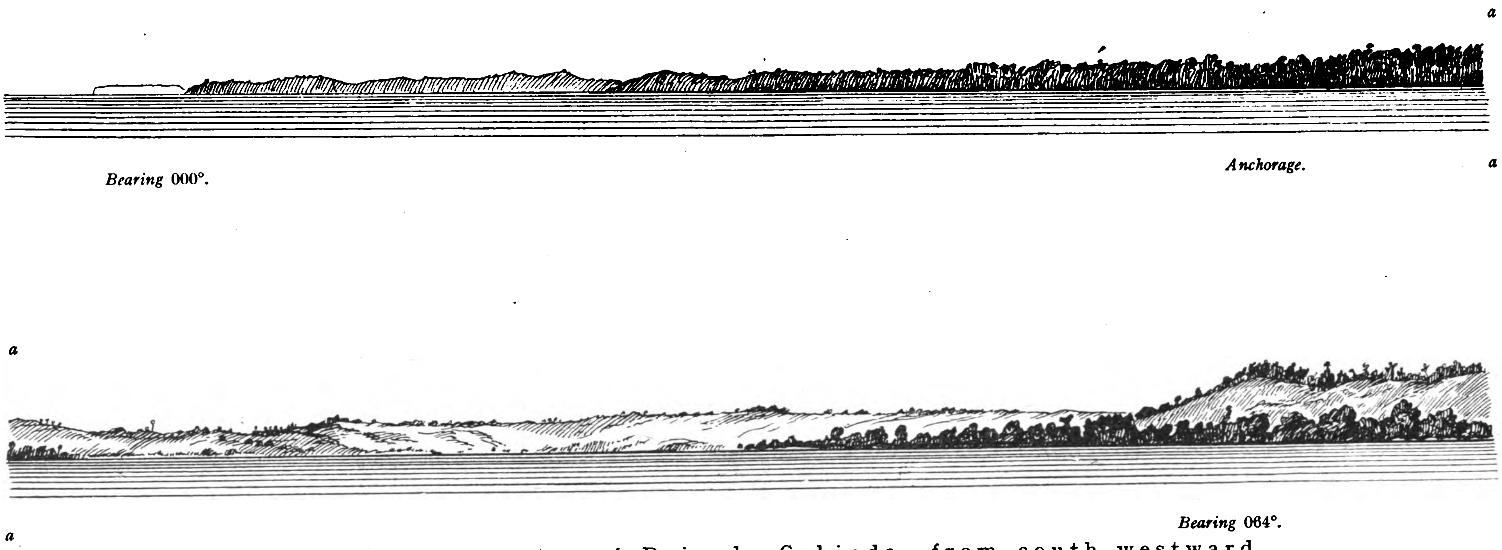


Ponta de Tafe lighthouse.
(*Original dated* 1949.)



Ponta de Moita Sêca lighthouse.
(*Original dated* 1949.)

To face page 191.



View, in two parts, of Baia de Cabinda, from south-westward.

(*Original dated* 1871.)

Chart 604, plan of Baia de Malembo.

western side by a low tongue of land, prolonged by a shallow spit. This peculiarity of form is probably due to the continual action of the south-westerly swell together with that of the prevailing current which flows northward along the coast. These bays are very difficult to identify from the offing, as the low points cannot be distinguished from the background, and this is especially the case with regard to Baia de Malembo.

Rollers are frequent and heavy, especially about the times of the spring tides; they occur, more often than not, during calms, so that even small vessels within the shoal off Ponta de Malembo are unsafe unless well in towards the head of the bay.

Inside the shoal off Ponta de Malembo, the depths are very regular and decrease from 3¾ fathoms ($6^{m}9$), but at the northern end of the bay depths of from 1¾ to 2½ fathoms ($3^{m}2$ to $4^{m}6$) extend offshore up to a distance of 6½ cables.

The settlement of Malembo is situated near the edge of a cliff of red argillaceous earth, about 100 feet ($30^{m}5$) high, that rises abruptly from the beach. The climate, in comparison with that of other places in West Africa, is very healthy, owing to the absence of forests. The natives are mild and tractable, but extremely indolent.

Anchorage.—Baia de Malembo, though affording snug anchorage to small vessels, is not adapted to vessels of deep draught, as the latter are obliged to anchor farther out and are there exposed to the heavy swell.

Large vessels usually anchor well northward of the bay, in depths of 5 or 6 fathoms ($9^{m}1$ or $11^{m}0$), with Ponta de Malembo bearing about 154°. Small craft, by going well into the bay, may lie in smooth water.

On account of the rollers in Baia de Malembo, vessels sometimes anchor southward of Ponta de Malembo, about 2 miles from the coast, in depths of 6 or 7 fathoms ($11^{m}0$ or $12^{m}8$), mud.

Landing may be effected in a cove within Ponta de Malembo. A small stream, which sometimes nearly fails in the dry season, flows into the head of the bay.

Chart 604.

Coast.—From Ponta de Malembo, the coast trends in a south-south-easterly direction to Ponta Cascaes, the termination of the cliffy coast, which latter appears as a table land of moderate elevation.

Ponta Cascaes, which forms the northern entrance point of Baia de Cabinda (Kabinda), is distinguished by being of a brighter colour than the land in its immediate vicinity: southward of it the hills, which lined the coast northward disappear, and a broad low plain, studded with palm trees, extends as far as the mouth of Rio Lulondo (M'Bele), situated about 6 miles southward of Ponta Malembo.

The village of Futila (*Lat. 5° 24′ S., Long. 12° 12′ E.*) is situated close southward of the mouth of Rio Lulondo, which is a small stream, southward of the mouth of which a bank of sand and rocks fronts the coast, and extends in places for a distance of about 2 miles offshore. On the outer edge of this bank there are depths of only 2¾ fathoms ($5^{m}0$), but the sea does not usually break upon it. In 1853, H.M.S. *Alecto* touched on the outer edge of this bank in a depth of 3 fathoms ($5^{m}5$), with the town of Cabinda, situated on the heights overlooking Baia de Cabinda, bearing 170°, and distant about 3½ miles. Care

Charts 1013, 2202a, 2203, 2127.

Chart 604.

should therefore be taken to sound frequently and to give this part of the coast a wide berth. The British factory at Cabinda, *see* below, bearing less than 165°, clears this bank.

Chart 604, plan of Baia de Cabinda.

Baia de Cabinda.—Ponta de Tafe, the south-western entrance point of Baia de Cabinda, is low and covered with bushes; it is situated about 13 miles southward of Ponta de Malembo.

Shoal depths obstruct the greater part of Baia de Cabinda, making it available only as an anchorage for small vessels. A shoal extends for a distance of 5 cables from the western side of Ponta de Tafe, and some rocks lie close to the point. Depths of 3 fathoms ($5^{m}5$) extend across the bay about 1½ miles from its head, and a rocky tongue projects north-westward from the centre of this shoal. The outer extremity of this tongue, over which there is a depth of 2½ fathoms ($4^{m}6$), and on which rollers frequently break, lies nearly 3 miles from the head of the bay and about 1¾ miles northward of Ponta de Tafe.

It is reported that the depths in the bay are less than those shown on the plan on chart 604.

A range of hills, which skirts the coast northward of the Congo river, ends just southward of Cabinda, and serves to identify the bay. The head of the bay is formed by a sandy beach backed by lofty cliffs, green hills, and deep valleys.

About 2 miles eastward of Ponta de Tafe (*Lat. 5° 33′ S., Long. 12° 11′ E.*) is the mouth of Rio Lucola, on the heights eastward of which are several scattered villages; farther northward is a rounded point known as Umbrella point, northward of which the land gradually slopes to the low plain in the vicinity of Futila, *see* view facing page 191.

Light.—Buoyage.—A light is exhibited, at a height of 89 feet ($27^{m}1$), from a white square iron tower, 65 feet ($19^{m}8$) in height, on Ponta de Tafe. *See* view facing page 190.

A light-buoy, No. 1, painted red and exhibiting a *red flashing* light *every three seconds*, is moored about 11 cables north-westward of Ponta de Tafe light-structure.

A red conical buoy, the position of which is not to be depended upon, is moored about 10½ cables north-north-westward of Ponta de Tafe light-structure.

Anchorage.—Jetty.—Ponta de Tafe may be approached in safety when the British factory, a white house with a flagstaff, situated about half a mile eastward of it, bears less than 165°, but more than 120°. Anchorage may be found between these bearings according to draught; but vessels should anchor outside the line where the rollers begin to be affected by the bottom and to accumulate a surface velocity, though vessels of shallow draught may anchor under the shelter of Ponta de Tafe.

Landing can easily be effected, except at dead low water, at a jetty in front of the British factory.

Cabinda.—This settlement is hidden in the trees on the sides and summit of some elevated land about half a mile eastward of Ponta de Tafe. There is a hospital at Cabinda and on the shores of the bay are several factories. Above the town is a three-storied tower, originally built as a lighthouse, but now used as a clock tower.

The Residency is situated about 1¾ miles east-south-eastward from

Charts 1013, 2202a, 2203, 2127.

Chart 604, plan of Baia de Cabinda.

the lighthouse on Ponta de Tafe. A conspicuous tree stands close south-eastward of the Residency.

Numerous villages, or groups of huts, skirt the bay and are scattered inland as far as the distant hills.

Cabinda is connected to the general telegraph system, and there is a radio station.

Supplies are few, but vegetables are plentiful in season, and the bay abounds in fish.

Small repairs can be effected.

There is occasional steamship communication with Europe.

Palm oil and kernels are exported.

Chart 604.

Current.—The current from the Congo river flows north-westward, parallel with the coast, leaving an area of comparatively slack water between it and the shore. This area of slack water can be utilised to their advantage by vessels of low power proceeding southward along the coast; the colour of the water of this current soon shows if a vessel is too far out. Sometimes, though very rarely, the current turns towards the coast past Cabinda; when this happens it is said to run with considerable force.

Coast.—From Ponta de Tafe (*Lat. 5° 33′ S., Long. 12° 11′ E.*) to the entrance to the Congo river, a distance of about 30 miles, the country is particularly fertile; and is well populated. Numerous canoes may be seen fishing off the coast.

From Ponta de Tafe, the coast trends south-south-westward for about 8 miles to Ponta Povo Grande and thence a further 4 miles southward to Ponta N'gelo; it is fronted by shoal water which, extending about 1½ miles offshore, is generally indicated in places by breakers. Rollers have been known to break in depths of about 7 fathoms ($12^{m}8$) at a distance of 5 miles offshore, so this part of the coast should not be approached within a depth of 12 fathoms ($21^{m}9$).

The coast between Ponta de Tafe and Ponta N'gelo is low and fringed with forest, but at a short distance inland, and about 3 miles southward of Cabinda, the land rises to hills of a reddish colour which extend with nearly uniform height to the northern bank of the Congo. At about 5 miles southward of Cabinda, two of the hills are somewhat higher and nearer to the coast than the others and are known as Dos Montes, but they are difficult to distinguish. Within this coastal range, and at a considerable distance inland, is another which shows up more distinctly as a separate range when seen from southward of Ponta N'gelo.

Ponta N'gelo, the northern point of the estuary of the Congo, is low at its extremity and covered with trees. Except when viewed from northward, it is difficult to distinguish this point. Within the point, the land rises for a short distance to an eminence of a reddish colour; near this eminence there is a grove of palm trees resembling a plantation.

From Ponta N'gelo the coast trends in a south-easterly direction for about 17 miles to Mosquito creek, and is fringed with a narrow, sandy beach. This part of the coast resembles that farther northward with the exception that from about 3¾ miles northward to 1½ miles southward of Mosquito creek it consists of steep red cliffs.

These resemble similar cliffs southward of Ponta da Moita Sêca on the

Charts 1013, 2202a, 2203, 2127.

Chart 604.

southern side of the estuary, but Moanda lighthouse (*see* below) will serve to distinguish them.

Northward of Vista, situated about 5½ miles northward of Mosquito creek, is a factory hidden in the trees and close southward of that place is the village of Ma Kamma (*Lat. 5° 50′ S., Long. 12° 14′ E.*).

Chart 638.

Mosquito creek is the mouth of a narrow stream on which is the village of Moanda. The creek may be recognised by a remarkable grove of trees on its right bank, known as Fetish wood.

Light.—Moanda light (*Lat. 5° 56′ S., Long. 12° 20′ E.*) is exhibited, at an elevation of 118 feet ($36^{m}0$), from a white stone tower, situated on the summit of a conspicuous red cliffy point, about one mile south-south-eastward of Mosquito creek.

Charts 638, 604.

Mona Mazea bank.—Off-lying dangers.—Buoy.—Mona Mazea bank, an extensive shoal the name of which signifies "little water," fronts the coast from about 4 miles southward of Ponta N'gelo to the entrance to the Congo. In some places the 3 and 5 fathoms ($5^{m}5$ and $9^{m}1$) contour lines lie at distances of 3½ and 6½ miles, respectively, offshore; and from these lines the depths generally decrease regularly towards the coast, though there are places in which the depths are irregular. As a rule the bank should be avoided on account of the almost constant swell and frequent rollers; the latter usually set in at the full and change of the moon. Temporary anchorage can, however, be found on the outer part of the bank by sailing vessels if the wind fails, or by steamers desirous of awaiting daylight before entering the river.

The current from the Congo always runs strongly over the bank.

It has been reported that there the depths are generally less on Mona Mazea bank than are shown on charts 638 and 604; and shoal spots, previously unknown, have been found on the bank beyond its supposed limits.

Ponta ma Caia lies 2½ miles south-eastward of Vista. A narrow reef extends about 1¼ miles in a south-westerly direction from this point.

A small detached shoal, over which there is a depth of 2¾ fathoms ($5^{m}0$), lies close inside depths of 5 fathoms ($9^{m}1$) and about 6 miles west-south-westward of Vista.

A 4-fathom ($7^{m}3$) patch, named the Vestal patch, lies about 9¾ miles westward of Moanda lighthouse.

A 1¾-fathom ($3^{m}2$) patch lies about 8¼ miles west-south-westward of Moanda lighthouse. A black can buoy is moored in a position about one mile west-south-westward of the shoal.

A 2¾-fathom ($5^{m}0$) patch, reported by H.M.S. *Pandora* in 1866, lies about 3 miles west-south-westward of Moanda lighthouse.

Great caution should be exercised when in the vicinity of these dangers.

CONGO RIVER ENTRANCE.—Aspect.—The mouth of this noble estuary, which may be said to commence at Boma, 50 miles from the sea, extends from Ponta N'gelo to Ponta da Moita Sêca (*Lat. 6° 07′ S., Long. 12° 16′ E.*), situated about 25 miles south-south-eastward of it. At about 10 miles eastward of the line joining these extreme points, the width of the estuary is reduced to about 2½ miles

Charts 1013, 2202a, 2203, 2127.

Charts 638, 604.

between Pointe Bulabemba on the northern bank, and the entrance to Rio do Fuma-Fuma on the southern bank.

Depths of 100 fathoms (182^{m}9) extend at a distance of between 30 and 40 miles westward of the vicinity of the estuary, but these are interrupted by a remarkable gully, from 2 to 8 miles in breadth, in which there are depths, in some places, of over 800 fathoms (1,463^{m}0). This deep gully runs right into the mouth of the river, its sides are steep-to and irregular, and a depth of over 100 fathoms (182^{m}9) will be found more than 7 miles eastward of Pointe Bulabemba.

From a position about 18 miles west-north-westward of Pointe Bulabemba, the low northern shore is just visible as a line of trees broken here and there by gaps. The coast southward, in the vicinity of Ponta do Padrão, may be identified by its tall mangroves.

Chart 638.

Northern side of outer entrance.—From Mosquito creek, the coast continues in a south-easterly direction for about 7 miles.

About three-quarters of a mile southward of Moanda lighthouse, the red cliffs are succeeded by a beach which stretches for about 2½ miles to the root of Banana peninsula.

Banana peninsula is a low, narrow, sandy spit which is about 2½ miles in length from a position about 3¾ miles south-eastward of Moanda lighthouse; it terminates at Pointe Française and forms the west side of Crique de Banana.

On the peninsula are the white buildings of the settlement of Banana.

Should rollers occur on the coast at the time of the equinoctial tides, the greater part of Banana peninsula is submerged.

The whole of this part of the coast is fronted by a continuation of Mona Mazea bank; the edge of it, on which there is a depth of 3 fathoms (5^{m}5), is charted from one to two miles offshore. This bank is reported to be extending westward, and as there may also be undiscovered dangers on it, the greatest caution is necessary in its vicinity.

Southern side of outer entrance.—Anchorage.—Ponta da Moita Sêca is of moderate elevation, and, when seen from northward at a distance of about 7 miles, appears as a steep cliff. The point derives its name, which signifies " dry thicket," from the stunted vegetation which covers a mound upon it.

A point which is the extremity of a slightly rounded eminence, covered with tall trees, is situated about 1¾ miles north-eastward of Ponta da Moita Sêca lighthouse.

Ponta do Padrão (*Lat. 6° 04′ S., Long. 12° 20′ E.*), is situated about 4 miles east-north-eastward of Ponta da Moita Sêca lighthouse, and the intervening coast recedes to form a slight indentation.

Abreast the middle of this indentation is a bank, the outer edge of which, with depths of 10 fathoms (18^{m}3) over it, lies about 7 cables offshore; this bank is well adapted as an anchorage, but there are several deep holes in it, and caution is therefore necessary. *See* also page 35.

Ponta do Padrão is the north-eastern termination of a low narrow point on the eastern side of which is Baia de Diogo Cão.

Shoal water extends about 1½ cables northward, and half a mile west-north-westward from Ponta do Padrão; beyond this the depths increase rapidly, and at a distance of half a mile in a northerly direction from the point, there are depths of 55 fathoms (100^{m}6). A detached

Charts 604, 1013, 2202a, 2203, 2127.

Chart 638.

bank, with depths of less than 20 fathoms (36^{m}6) over it, lies about 1½ miles northward of the point, and near its western edge an 8-fathom (14^{m}6) patch was reported, in 1943.

The point may be safely passed at a distance of 5 cables. There is a village on Ponta do Padrão, and about 3 cables within the point there is a small cemetery, the inscriptions therein showing that it has been used by H.M. vessels since 1857. Near the extremity of the point is a marble column, which was set up by the famous Portuguese navigator Diego Cam in 1486; it is about 15 feet (4^{m}6) high, and bears an inscription.

Lights.—Light-buoys.—A light is exhibited at an elevation of 57 feet (17^{m}4), from a white iron framework structure, erected on Pointe Bulabemba. The light-keeper's house, a yellow building, is situated nearby. In 1947, the light-keeper's house and the light-structures were difficult to see beyond a distance of 3 miles.

A light is exhibited, at an elevation of 76 feet (23^{m}2), from a white hexagonal tower, 70 feet (21^{m}3) in height, situated near the coast about one mile northward of Ponta da Moita Sêca; *see* view facing page 190.

A light is exhibited, at an elevation of 26 feet (7^{m}9), from a white iron framework structure situated near a light brown house with a red roof, standing a short distance within the extremity of Ponta do Padrão (*Lat. 6° 05′ S., Long. 12° 20′ E.*).

A conical light-buoy, painted red and exhibiting a *white flashing* light *every three seconds*, is moored about 2½ miles east-south-eastward of Ponta do Padrão light-structure; it is known as Boia de S. Antonio do Zaire.

A conical light-buoy, painted black, known as "Banana (1)," exhibiting a *white flashing* light *every second*, is moored in a position about 1¾ miles west-south-westward of Pointe Française, but it cannot be depended upon.

Inner entrance of River Congo.—Buoys.—Beacons.—Baia de Diogo Cão, on the southern side of the river, is shallow and is not recommended as an anchorage. Several creeks enter the bay, the most important being that in the south-eastern corner, known as Rio de Santo Antonio. The Portuguese chart of 1933 shows a least depth of 7 feet (2^{m}1) over the bar of this river. About three-quarters of a mile up this river is the Portuguese station of Santo Antonio do Zaire, which is the principal town in the district of that name. There is a radio station there.

There is a beacon on the western side of the entrance to the river, the approach to which is marked by buoys, but the river can only be ascended by vessels of about 6 feet (1^{m}8) draught.

A Portuguese river steamer service is maintained between Santo Antonio de Zaire, Boma, and Noqui, *see* page 210.

A conspicuous building, known as Casa de C.U.F., is situated in the town of Santo Antonio do Zaire, and a beacon known as Pilotos stands about 3 cables eastward of the mouth of the river.

Rio do Cutelambeje is situated about 2 miles eastward of Rio de Santo Antonio, but its entrance appears to be almost completely barred by a large drying sandbank, and the creek itself is very narrow and shallow.

A beacon stands on each side of the entrance to this creek, the

Charts 604, 1013, 2202a, 2203, 2127.

western beacon being known as Tompe and the eastern as Marco do Fundeadouro.

Pointe Bulabemba, on the northern side of the river and situated about 2¾ miles south-eastward of Pointe Française, is low, but can be identified by the lighthouse on it, and by a clump of trees near its extremity, which are higher than others in the vicinity.

Between Pointe Française and Pointe Bulabemba are the entrances to Crique de Banana and Crique des Pirates, *see* below.

Rio do Fuma-Fuma on the southern side of the river is entered nearly opposite Pointe Bulabemba, about 2½ miles eastward of the mouth of Rio do Cutelambeje. Fuma-Fuma beacon stands on the western side of the entrance, which is nearly one mile wide, but is largely obstructed by a sandbank which leaves a narrow channel on the western side of the river.

Current.—The current runs with great strength to the northward at the entrance to the channel leading to Rio de Santo Antonio, in a position approximately 2¼ miles south-eastward of Ponta do Padrão (*Lat. 6° 05′ S., Long. 12° 20′ E.*).

Anchorages.—Vessels wishing to await daylight in order to enter the river can find good anchorage, out of the current, in a depth of from 6 to 7 fathoms ($11^{m}0$ to $12^{m}8$), from one to 2 miles westward of Ponta da Moita Sêça. It was reported, in 1945, that the pilots recommend vessels awaiting daylight to anchor on the edge of the bank about 2¾ miles westward of Pointe Française.

Good anchorage may also be obtained off the indentation south-westward of Ponta do Padrão in a depth of 8 fathoms ($14^{m}6$), with Pointe Bulabemba lighthouse just open northward of Ponta do Padrão, bearing about 080° and Ponta da Moita Sêca lighthouse, bearing about 225° ; *see* cautionary remarks on page 195. The surface current at this anchorage has been found to run continually westward, only slackening on the rising tide.

For continuation of the coast southward of Ponta da Moita Sêca, *see* page 213.

Crique de Banana.—Crique de Banana and Crique des Pirates are the main outlets of a network of channels, on the northern side of the estuary of the Congo, which extend from Pointe Française to Malela (*Lat. 5° 59′ S., Long. 12° 37′ E.*), and form a convenient route for boats, by which the strong current and rough water of the main river can be avoided.

Crique de Banana is entered between Pointe Française, *see* page 195, and the southern extremity of Île des Pêcheurs, situated about 4½ cables eastward.

On the northern side of Crique de Banana is the apparent termination of the range of hills described on page 193, which, after running parallel with the coast from Ponta de Tafe southward, turns eastward along the northern bank of the creek. From seaward these hills, which are about 400 feet ($121^{m}9$) high, appear to form the coastline.

The depth on the bar at Crique de Banana is not less than 15 feet ($4^{m}6$), and vessels drawing up to 19 feet ($5^{m}8$) can find good anchorage in the creek, *see* also " level of river ", page 202. Boats can ascend some 15 miles to Chimpeza (*Lat. 5° 54′ S., Long. 12° 35′ E.*), the channel to which appears clear and deep, but becomes narrow in the upper reaches. There are numerous villages and patches of cultivation

Chart 638.

on the crest of the hills referred to above, and also along the banks of the creek. A passage connects this creek with Crique des Pirates, from whence another passage leads to Malela, *see* page 204.

Banc Stella is a sandbank extending about 4 cables southward from Pointe Française; its southern edge is steep-to, but depths of 3 fathoms ($5^{m}5$) extend 1¾ miles westward from the point.

Île des Pêcheurs lies near the southern extremity of a bank, which dries and extends about one mile southward from Pointe Huard, on the eastern side of Crique de Banana.

A beacon is situated about 1½ cables south-south-westward of the south point of Île des Pêcheurs.

The bar at the entrance to Crique de Banana extends from the southern extremity of Banc Stella to that of the bank on which Île des Pêcheurs is situated, and the channel across it is only about one cable wide.

Caution.—In 1931 it was reported that the bar at the entrance to Crique de Banana had extended.

Tidal streams.—There is a regular tidal stream in the creek; the in-going stream having a rate of from half a knot to one knot, and the out-going stream from 1½ knots to 2 knots in the dry season. The water is always brackish.

Buoyage.—For Banana (1) buoy, *see* page 196.

A red conical buoy, surmounted by a cone and marked Banana (3), is established on the eastern side of the channel, and on the outer edge of the bar, in a position about 5½ cables south-eastward of Pointe Française.

A black can buoy, marked Banana (2), is established on the western side of the channel and on the outer edge of the bar, about 5½ cables south-south-eastward of Pointe Française.

Within the creek are one black can buoy surmounted by a ball, situated about 4½ cables south-south-eastward of Pointe Française, and one red conical buoy situated about 4 cables southward of Pointe Huard. Vessels should pass eastward of the black buoy and westward of the red buoy.

Signal station.—There is a signal station at the pilot house.

Directions.—**Anchorage.**—Vessels with local knowledge, after passing Ponta do Padrão (*Lat. 6° 05′ S., Long. 12° 20′ E.*) should steer for Pointe Bulabemba, making allowance for the strong current setting north-westward, and taking care to avoid the shoal bank which lies westward and southward of Pointe Française.

When Pointe Huard bears about 000°, a course may be shaped to pass between the outer buoys.

Occasionally, when the out-going stream is running, a set towards the western side of the entrance will be experienced in the vicinity of the outer buoys, above which the stream will be found to run in the general direction of the channel.

When past the inner buoy, a convenient anchorage may be selected as desired. The best anchorage is stated to be in the middle of the creek, abreast the two small piers situated about half a mile northward of Pointe Française. If intending to remain for more than a short time, it is advisable to moor in order to avoid a foul anchor.

Vessels bound to or from the ports in the Belgian Congo must enter or clear, and pass the health officer, at Banana.

Charts 604, 1013, 2202a, 2203, 2127.

Chart 638.

Pilots.—Pilots come off to vessels in a motor boat. It is necessary to give a few day's notice by radio, stating the expected date and time of arrival off Banana.

As the banks of the Congo are frequently changing, local knowledge is absolutely necessary for ascending the river. Government pilots can be obtained at Banana (*Lat. 6° 01′ S., Long. 12° 24′ E.*).

Banana.—The settlement of Banana is situated on the peninsula of that name, about half a mile northward of Pointe Française, and consists of numerous buildings, the cable station, and two small piers.

Fish of good quality may be obtained, and also a limited supply of fowls, eggs, fruit, etc. Beef and fresh water are not available.

Banana is connected to the general telegraph system, and also by telephone with Boma.

There is a radio station, *see* page 44.

There is occasional steamship communication with Europe.

The creek has somehow acquired an unenviable notoriety for unhealthiness. This is probably true, in common with the rest of the Congo, during the wet season; but during the dry season, May to October, it does not appear to be unhealthy, as a fresh sea breeze blows across the peninsula for the greater part of the day and night. Locally, Banana is regarded as the sanatorium of the Congo; it is healthier than Boma, and much more so than Matadi.

Radiobeacon.—There is a radiobeacon (*Lat. 6° 00′ S., Long. 12° 27′ E.*) near Banana: for details, *see* Admiralty List of Radio Signals, Volume II.

Chart 1013.

RIVER CONGO.—General remarks.—In 1482, Diego Cam set out from the Portuguese settlement of El Mina, on the Gold coast, to continue the examination of the western coast of Africa; in so doing he crossed the equator and, discovering the Congo river, obtained for himself well-deserved renown.

The Portuguese discoverer conferred the name of Congo on the river from the name of the country through which it flows, but he afterwards found that by the natives it was called Nzadi, which the Portuguese rendered as Zaire, and the first and last names have since been used indiscriminately by Europeans. It now appears, however, that Zaire, or Nzadi, is the general appellative for any great river, and that the native name of the individual river in question is Moienzi Nzadi, or the river which absorbs all other rivers. At the present time it is referred to by the Portuguese as Rio Zaire, and the natives know it simply as Nzadi.

The River Congo is considered to be the second in magnitude of the African rivers, and is about 2,000 miles in length. It was first roughly surveyed, for about 300 miles, by Captain Maxwell in 1793, but was more completely examined for the same distance by the unfortunate expedition of Captain Tuckey, R.N., which reached Isangila (*Lat. 5° 13′ S., Long. 13° 54′ E.*) in 1816; the mouth of the estuary was surveyed by Captain Vidal, R.N., in 1825.

Between the years 1874 and 1877, the Congo was traced by the African traveller, H. M. Stanley, from its source in Lake Bemba or Bangweolo (*Lat. 11° S., Long. 30° E.*); from this lake it flows nearly due north to the equator, crossing it in long. 26° E., and about 40 miles

Charts 2202a, 2203, 2127, 2483.

Chart 1013.

southward of the line it descends the seven cataracts named the Stanley falls; it then takes a north-westerly direction to lat. 2° N., then westerly to long. 20° E., and thence runs in a general south-westerly direction to Stanley pool (*Lat. 4° 15′ S., Long. 15° 30′ E.*). Between Stanley pool and Matadi, situated about 80 miles from the sea, the river descends, within a distance of 100 miles, the 32 cataracts, named the Livingstone falls, the last cataract being just above Matadi.

A railway, to overcome the obstruction caused by the Livingstone falls, runs from Ango Ango, just below Matadi, both of which places can be reached by ocean-going vessels, to Léopoldville, the capital of Belgian Congo, on the southern shore of Stanley pool.

Between Stanley pool and Stanley falls the river is navigable for a distance of about 900 miles, and a number of stern-wheelers, some as large as 500 tons, ply between Léopoldville and Stanleyville, which latter is situated just below the Stanley falls. At Léopoldville there is a floating dock for the use of river craft.

Charts 638, 634.

Directions.—Buoys.—Beacons.—Caution.—It is not intended to give either a detailed description of the islands and banks of the Congo, or minute directions for ascending the river, as the channels are constantly changing, especially during the wet season, and at times new islands are formed, and old ones swept away by the violence of the current. Though the river is well marked by buoys and beacons, the services of a pilot are absolutely necessary at all times. The buoys, which are frequently altered by the local Belgian Hydrographic Service as necessity arises, are often washed under by the current, or swept away altogether by the floating islands that come down the river during the wet season; they cannot therefore be depended upon, and moreover, missing buoys are sometimes temporarily replaced by others not in accordance with the general system.

In ascending the river, all red buoys should be left on the starboard hand, and all black buoys on the port hand. *See* page 43.

Currents.—The surface water is still quite fresh at a distance of 9 miles seaward of the mouth of the Congo, and it is only partially mixed with that of the sea at a distance of 40 miles from the coast; whilst discoloration caused by the fresh water, and also a perceptible current, has been reported 300 miles offshore.

H.M.S. *Rambler*, in April, 1899, while proceeding from Fernando Póo to Luanda, encountered a northerly current of about one knot from lat. 2° N., southward. The water was of a dark olive green colour, and became browner and of less density as the Congo was approached; immediately the mouth of the river was passed it changed to normal. The temperature of the sea was almost invariably about 2° higher than that of the air, the lowest observed being 80° F. (air 81° F.), and the first occasion on which the temperature of the water fell below that of the air, being at 2000 on the 7th in lat. 5° 35′ S., just before passing out of the Congo stream.

The density fell on 7th April until it reached 12 at 2000, rising again to 22 at 0000. From lat. 5° 20′ S. to 5° 50′ S. numerous patches of scum and strong ripples, affecting the steering of the ship, were passed through; when southward of the Congo, ripples were also observed, as well as patches of drift rubbish. It was reported, in 1944, that the river current increased to about 3 knots off the mouth of Congo river.

Charts 1013, 2202a, 2203, 2127.

Charts 638, 634.

During the rainy seasons of the Congo basin, the current is very rapid and bears along with it floating islands, covered with small palms and grass, which it has torn away from the banks in its course. Some of these islands are more than half a cable in length, and, whilst being dangerous to vessels under way, are even more so to those at anchor; in addition, they frequently sweep away the buoys marking the channels. Smaller floating islands, and débris of all kinds are met with far out to sea, sometimes as far northward as Annobon. Even in the low-river seasons these floating islands are encountered in the river, but not of sufficient size to be dangerous.

The maximum rates of current have been observed by the Belgian Hydrographic Service, during the season of high river, as follows:—

Banana to Quissanga 4 knots, Quissanga (*Lat. 6° 02′ S., Long. 12° 39′ E.*) to Monro Islands 4 knots, Monro Islands to Pointe Camoëns 3 knots, Pointe Camoëns to Fetish rock 4·1 knots, Fetish rock to Boma 4·8 knots, Boma to Matadi 9·7 knots.

The maximum rate in the Rade de Boma was 4·8 knots, and in the Rade de Matadi 7·5 knots.

In the channels northward of Îles Bulikoko, the maximum rates observed were:—From Archipel des Herbes to Katala, 4·5 knots; between Banc des Fraudeurs and Île Bulikoko, 4·5 knots; between Ilots des Hippos, Amont and Aval, 4·4 knots; in the narrows off Pointe Camoëns, 3·8 knots.

At low river the following maximum rates are given for certain channels:—Banana to Quissanga, 2 knots; Quissanga to Monro islands, 2·9 knots; Monro islands to Pointe Camoëns, 2·8 knots; Pointe Camoëns to Fetish rock, 3·6 knots; Fetish rock to Boma, 3·5 knots; Boma to Matadi, 5·9 knots.

In the Chaudron d'Enfer, about 2 miles below Matadi, a current of 6 knots has been found during low river, and at high river the current runs from 10 to 11 knots. Vessels capable of steaming 10 knots have been unable to reach Matadi (*Lat. 5° 49′ S., Long. 13° 27′ E.*) in December, *see* page 211.

Whirlpools.—In November, 1947, H.M.S. *Nereide* encountered no whirlpools of sufficient size to render steering difficult below Les Trois Soeurs islets (page 209), but between those islets and Matadi they were often severe. She found it best to use full helm at once to counteract the slightest tendency of the ship to swing, as, if even a small sheer were taken, the current tended to turn her rapidly broadside on to the channel.

Chart 1013.

Level of river.—The rivers of the Congo system are, as a rule, either rising or falling, and seldom remain at their mean level for any length of time. The Congo itself, and its left bank affluents, more especially the Kasai, have two periods of high level and two periods of low level each year; whereas the right bank affluents, especially the Ubangi and Sanga, have only one period of high level and one of low in the course of the year.

The Congo is low in March and July, and high in May and December. The rivers flowing from the Kasai region, in the Katanga and the southern part of the eastern highlands, being in flood in May, cause the main river to rise rapidly.

After the middle of May the Congo begins to fall, and low river

Charts 2202a, 2203, 2127, 2483.

Chart 1013.

level is reached in July. At Stanleyville, this minimum is lower than that of March, whereas at Lukolela, situated opposite the confluence of the Congo and the Sanga, the main river is lower in March than in July. This is due to the rise in the Ubangi, which begins in April, while the Itimbiri, Aruivimi, and other right bank tributaries are also in flood. The rise, however, is not felt below the confluence of the Congo and the Kasai on account of a great diminution in the discharge of the latter, so that at Léopoldville the Congo is at its lowest in July and August.

Neither the Ubangi nor the Sanga attain their maximum heights until the month of October; and it is not until the left bank tributaries begin to rise, as a result of the increasing rainfall southward of the Equator, that the Congo reaches its second maximum, which occurs about the middle of December. After this, as a result of the annual fall in the level of the right bank tributaries, and the intervention of a short dry period southward of the Equator, the main river falls until it reaches the March minimum.

From the above account, confirmed by the latest investigations, it follows that the double maximum and double minimum are due, not so much to the alternate flooding of the tributaries lying, respectively, northward and southward of the Equator, as was formerly believed, but rather to the double rainy season in the region southward of the Equator. The northern affluents contribute to the result, but the southern appear to control the level of the river.

The variations, from year to year, in the amplitude of the annual floods of those rivers of which the discharges have been carefully measured are considerable; but, whether the flood be high or low, its general character along its course remains the same from year to year. On the Congo, Ubangi, Sanga, and Kasai this is particularly the case, variations in the discharge of their tributaries, and local precipitation having only a slight modifying effect.

Charts 638, 634.

At Matadi (*Lat. 5° 49′ S., Long. 13° 27′ E.*) there is a difference between high and low river of about 23 feet (7^{m}0); at Boma of 9 feet (2^{m}7); at Fetish rock, about 6 miles below Boma, of 7 feet (2^{m}1); at Mateba of 5 feet (1^{m}5); and at Banana of 2 feet (0^{m}6).

According to local observations the river at Matadi is about 87 feet (26^{m}5) above the level of the sea.

During the visit of H.M.S. *Rambler* to Matadi, in the latter part of 1899, a slight regular rise and fall of about 4 inches (0^{m}1) was recorded, but the observations could not be continued long enough to determine whether this was really due to the tidal influence or not. Tidal influence is, however, quite perceptible at Boma.

Undercurrents in the Congo, etc.—Observations made by Commander H. E. P. Cust, R.N., H.M.S. *Rambler*, in September and October, 1899, indicate that the fresh water of the Congo extends from the surface to the bottom until just below Quissanga (*Lat. 6° 02′ S., Long. 12° 39′ E.*), where it encounters a body of salt water filling the deep gully at the mouth of the river; it then flows over this denser water with decreasing depth and increasing velocity. This layer of fresh water also decreases in depth as the estuary widens, but it is deeper on the ebb tide than on the flood tide; about 5 miles below Quissanga it extends to from 3 to 5 fathoms (5^{m}5 to 9^{m}1) below

Charts 604, 1013, 2202a, 2203, 2127.

Charts 638, 634.

the surface, whereas after passing Pointe Bulabemba (*Lat. 6° 03′ S., Long. 12° 26′ E.*) it is only a few feet in depth.

The deep body of salt water is either perfectly still, or has a very slight tidal flow of from two-tenths to half a knot, up river with the flood tide, and down with the ebb.

The nature of the bottom in the Congo itself, with the exception of that in the deep gully, is almost invariably sand, though in places hard clay may be found. In the gully there is everywhere a deep deposit of soft mud and decayed vegetable matter; another proof of the tranquillity of the water near the bottom. Mud is found in the small creeks in the upper part of the river, and also on the mangrove-covered banks which extend down river from Quissanga (*Lat. 6° 02′ S., Long. 12° 39′ E.*).

The water of the river itself is heavily charged with sand, and it would appear that a very large proportion of the mud found in the gully is from the washings of the immediate neighbourhood, which is a vast expanse of mangrove swamp, with a network of innumerable creeks, drained at every tide.

The great difference between the rates of the surface and undercurrents in the estuary of the Congo fully accounts for the difficulty in steering so often reported. With good speed, and proceeding either directly with or against the surface stream, this is not so much felt; but if broadside on to the current and proceeding slowly, a vessel is at times almost unmanageable.

Vessels grounding on the banks where the current is strong have had the sand piled up against one side, nearly to the surface of the water in a few hours, and then a sudden swirl of the current has washed it all away and left them in deep water.

It is stated by one local authority that, on grounding, the anchor should never be let go, as sooner or later the current will wash bank and ship together down the river until deep water is reached. Another local opinion, however, is that the above statement is open to question, depending upon the position of the ship in relation to the bank on grounding. Consideration of the action to be taken is therefore necessary in each case.

Chart 638.

Pointe Bulabemba to Jacarés.—Beacons.—Between Pointe Bulabemba and Jacarés, about 12 miles east-north-eastward, the banks of the river, formed of alluvial deposits, are covered with a dense growth of palms and giant mangroves; one species of the latter grows to a considerable size, with a straight stem sometimes upwards of 100 feet ($30^{m}5$) in height, supported by an arch of roots which rise as much as 20 feet ($6^{m}1$) from the ground. The spaces between these mangroves are filled with various trees of smaller size.

The country near the river is low and swampy, but, at some distance inland, low ranges of hills from 200 to 500 feet ($61^{m}0$ to $152^{m}4$) high, may be seen on either side; these hills are covered with grass and occasional patches of trees.

From Pointe Bulabemba, *see* page 195, the low broken shore of the northern side of the river trends east-north-eastward for about 8 miles.

It is interrupted by the mouths of several creeks, but none are of any importance except Rambler pass, which lies between Île Zungu-Kia-Kambula and Îles Monpanga, about 9 miles east-north-eastward of

Charts 604, 1013, 2202a, 2203, 2127.

Chart 638.

Pointe Bulabemba lighthouse. This pass is clear and deep, and leads to the anchorage off Malela (*Lat. 6° 00′ S., Long. 12° 37′ E.*).

A shoal extends along this shore, and is reported to be subject to great changes. In 1935, portions of this shoal, named Banc Leman, dried at low water ; a beacon was situated on one of the drying patches about 5¼ miles east-north-eastward of Pointe Bulabemba lighthouse.

Buoys in the Congo river, *see* page 200.

In the afternoon, when the sea breeze is blowing, the edge of this shoal is plainly visible, and vessels of low power can with advantage keep along it in depths of about 6 fathoms ($11^{m}0$), and thus avoid the strength of the main stream.

Malela is situated about 2¾ miles north-eastward of the southern extremity of Île Zungu-Kia-Kambula ; there is a conspicuous white factory and a small pier here.

The southern bank of the river is interrupted by several creeks. About 2 miles eastward of Rio do Fuma-Fuma (page 197) is the mouth of Canal do Porto Rico, in the entrance to which there were, in 1933, two drying sandbanks ; one lying off the western entrance point, and the other nearly in mid-channel. There is a bar across the entrance to this creek, over which a depth of 8 feet ($2^{m}4$) can be carried, but there are greater depths within. A mooring buoy is situated off the entrance to the channel, which is marked by a beacon on its western side.

About 2½ miles within the entrance to Canal do Porto Rico is the settlement of Porto Rico, close eastward of which is the mouth of Canal do Sumba.

About 2 miles eastward of the entrance to Canal do Porto Rico is the Portuguese settlement of Cafumbila which is marked by a beacon ; on the hills above it is a sanatorium.

The small settlements at Songo and Pendi, 1½ and 3½ miles respectively, east-south-eastward of Cafumbila are both marked by beacons.

About 4 miles eastward of Cafumbila is the common entrance to 3 creeks, which is obstructed by sandbanks. About one mile eastward of this entrance is Ludisaki, in which there is a prominent chimney. The small settlement at Jacarés (*Lat. 6° 02′ S., Long. 12° 38′ E.*) is situated about 2¼ miles east-north-eastward of this chimney.

Anchorages.—Vessels whose draught is too great to admit of their entering Crique de Banana occasionally anchor on the shoal eastward of Pointe Bulabemba, opposite the first creek above the point, in a depth of about 6 fathoms ($11^{m}0$), but the current there is strong.

Anchorage can be obtained, in a depth of about 6 fathoms ($11^{m}0$), westward of the entrance to Canal do Porto Rico ; caution is necessary when approaching this anchorage as there are depths of 5 fathoms ($9^{m}1$) some distance offshore and the depths within it shoal very rapidly. The current at the anchorage is strong, and when the sea breeze is blowing in the afternoon the water is rough, but not as rough as it then is on the northern side of the river.

The chart shows an anchorage in about 6 fathoms ($11^{m}0$) off the settlement of Cafumbila.

The anchorage off Malela, though seldom used, is probably one of the best in the Congo ; it is off the factory, in from 5 to 7 fathoms ($9^{m}1$ to $12^{m}8$), about 2 cables offshore. The best channel by which to approach it is Rambler pass, *see* page 203, on the northern side of Îles Monpanga.

Charts 604, 1013, 2202a, 2203, 2127.

Charts 638, 634.

Jacarés to Fetish rock.—About 1¼ miles above Jacarés, on the south side of the river, is Quissanga, which was once an important trading station. Ponta da Quissanga, like Jacarés, is marked with a beacon.

The country in the vicinity is one huge swamp, intersected by numerous creeks, on the banks of which are giant mangroves. As the river is ascended, this dense vegetation tends to disappear, and its place is taken by low banks of coarse hippopotamus grass.

On the southern side of the river, between one and 3 miles above Quissanga, are the mouths of several creeks.

Above Quissanga (*Lat.* 6° *02′ S., Long.* 12° *39′ E.*) the Congo widens out, and is obstructed by numerous islands, between which one main channel is kept open for shipping, *see* page 206.

Lawrence islands are a group of low sandy islands lying off the northern side of the river, from one to 3 miles east-south-eastward of Malela.

Chart 634.

Île Bulikoko, with Archipel des Herbes close off its western side, Îles des Herons close off its southern side, Îlots des Bécasses and Îlots Bulikoko close off its eastern side, and Îlots des Fraudeurs off its northern side, lies in mid-channel with the western extremity of Archipel des Herbes about 1¾ miles eastward of Quissanga.

All these islands are low, covered with grass and bushes almost level with the water, and are intersected by creeks and fringed by drying banks.

Buoys in the Congo river, *see* page 200.

Banc des Bécasses lies close off the south-eastern end of Îles des Herons.

Ponta da Lenha, situated on the northern side of the river, lies about one mile westward of the north-western extremity of Île Bulikoko.

Pointe de Katala, about 1¾ miles north-eastward of Ponta da Lenha is the western entrance point of Maxwell channel, *see* page 207.

Île Tunga, situated between Katala and the south-western end of Grande Île Mateba, divides Maxwell channel into two passages.

Grande Île Mateba extends from abreast Katala almost as far as Boma, *see* page 208.

Mateba, on the southern coast of the island, besides being the headquarters of the hydrographic service of the Belgian Government, is also the principal depot of the Compagnie des produits du Congo.

Crocodiles are particularly numerous in this part of the river, and grow to 25 or 30 feet ($7^{m}6$ or $9^{m}1$) in length.

Cul de Boma (*Lat.* 5° *52′ S., Long.* 12° *56′ E.*) are two small detached hills on the northern side of Grande Île Mateba, about 4 miles from its eastern extremity ; on the summit of one of them are some houses.

Îlots des Hippos Aval, covered with grass and sand, lie on the northern end of the shallow spit, extending eastward and north-eastward of Îlots Bulikoko.

Îlots des Hippos Amont and Archipel des Tortues form a group of islands that lie off the middle of the south-eastern side of Grande Île Mateba ; the southern part of this group forms the northern side of Passe Mateba Amont.

Monro islands, and the many other islands situated north-eastward of them, of which the largest is Île des Papyrus, lie on the southern half

Chart 634.

of the shallow spit extending from the southern side of the river between Pointe Claeyssens and Pointe des Palmiers about 7½ and 15 miles, respectively, above Quissanga, to a point nearly between the upper and lower groups of Îlots des Hippos. Monro islands are densely wooded, and are, together with the other islands lying off them, intersected by creeks.

Île des Cormorans are situated in mid-channel between Monro islands and Îlots des Bécasses.

On the southern bank of the river, south-eastward of Monro islands and the islands north-eastward of them, is a plain, known as Plaines de Congo Yella, on which are numerous villages and patches of cultivation.

Mangroves no longer fringe this coast and access is possible to the high ground about 2 miles inland. These hills, from 500 to 600 feet (152^m4 to 182^m9) high, are apparently a continuation of the high land situated about 5 miles south-eastward of the entrance to Canal do Porto Rico, but are only now visible for the first time since passing that part of the river.

Île des Oiseaux is low and swampy, and lies between the southern bank of the river, from Pointe des Palmiers to Fetish rock, and the south-eastern side of Îlots des Hippos Amont and Archipel des Tortues; it is covered with grass and a few bushes. The western point of the island is named Pointe Camoëns.

Pool de Camoëns is a large sheet of water lying westward of Île des Oiseaux, and between it and Îlots des Hippos Aval.

Île des Canards extends along the south-eastern side of Passe Mayaudon, with its south-western extremity about one mile east-north-eastward of Pointe des Palmiers. Îlot des Aigrettes lies on the north-western side of this pass, about 2 cables off the south-eastern side of Île des Oiseaux.

Fosse de Congo Yella is situated between the southern side of the river and Penfold shoal, on which are situated Île des Canards and Penfold islands.

Penfold point (*Lat. 5° 58′ S., Long. 12° 56′ E.*) is situated on the southern bank of the river about 3½ miles east-north-eastward of Pointe des Palmiers, the intervening shore, as also that a short distance beyond Penfold point, being composed of low sand cliffs with a grass-covered plain behind them. Two miles eastward of Pointe des Palmiers is the small settlement of Quitanda.

Fetish rock (Emilio de Carvalho), situated on the edge of a grassy plain, is the termination of a ridge of ironstone, and juts boldly out into the river about 3½ miles north-north-eastward of Penfold point. The rock is about 100 feet (30^m5) high, and on its summit are some ruins.

Near the rock is a Portuguese settlement, which is connected to the telegraph and telephone systems. Inland from the rock are some low hills.

Channels.—For buoys in Congo river, *see* page 200.—There are three channels through the islands and banks which obstruct the river between Quissanga and Fetish rock, but only one is kept open for shipping, and this alone will be described.

In 1936 the route then used passed through the following channels. (i) Passe Nord, between Archipel des Herbes and the northern bank

Charts 604, 1013, 2202a, 2203, 2127.

Chart 634.

of the river in the vicinity of Ponta da Lenha ; (ii) Passe Mateba Aval, passing the entrance to Maxwell channel, out of which a very strong current sets almost at right angles to the course of the river, then between Banc des Fraudeurs and Îlot des Fraudeurs, along the southern shore of Grande Île Mateba as far as Mateba ; (iii) between the upper and lower groups of Îlots des Hippos and westward of Île des Oiseaux ; (iv) through Passe Mayaudon between Île des Canards and Île des Oiseaux ; (v) through Passe Nisot, between Penfold islands and Île des Oiseaux ; thence westward and northward of Fetish rock to Boma.

Passe Nisot is the shallowest part between Banana and Boma, and is also the narrowest part of the channel, having a width of only about 95 yards ($86^{m}9$). In 1936 the least depth in Passe Nisot was 25 feet ($7^{m}6$) in July, and 28 feet ($8^{m}5$) in December.

Maxwell channel is entered between Pointe de Katala and the south-western extremity of Grande Île Mateba, about three-quarters of a mile east-north-eastward of it. In this entrance lies Île Tunga. This channel runs between the northern shore of the river and the western and northern sides of Grande Île Mateba ; it is encumbered with islands and shoals.

Fetish rock to Île des Princes.—Between Fetish rock and Île des Princes, close off the northern bank and about 9 miles east-north-east of Fetish rock, the character of the country changes ; the low swampy land gives place to hills, some of which rise to a height of over 500 feet ($152^{m}4$).

Fingal's Shield, 492 feet ($150^{m}0$) high, is a prominent granite monolith near the summit of a hill, situated on the northern bank of the river, northward of the eastern end of Grande Île Mateba.

Fort Shinkakasa is situated about 2 miles eastward of Fingal's Shield : it is in telephonic communication with Boma, and stands 135 feet ($41^{m}1$) above the river. Large pythons are frequently found in this vicinity.

Boma, *see* page 208, is situated about one mile eastward of Fort Shinkakasa.

Roche Jorgensen is situated half a cable north-westward of Fetish rock ; its position may usually be seen by the swirl of the current over it.

Roches Winton, a dangerous patch, is situated close north-westward of a point about 1½ miles east-north-eastward of Fetish rock, where the hills slope down to the southern bank of the river.

Île des Pêcheurs and Îlot Horne (*Lat. 5° 53′ S., Long. 12° 59′ E.*) are formed by a bank of sand surmounted by a few bushes, situated off the south-eastern side of Grande Île Mateba.

Île Selonga in mid-stream, is low and covered with grass, and lies about 3¼ miles east-north-eastward of Fetish rock.

Île Sacra Ambaka is situated in the centre of the river about half a mile eastward of Île Selonga ; it is only just above the level of the river except near its north-eastern end, where it rises to a well-wooded summit 240 feet ($73^{m}1$) high.

Île Rocca is situated about half a mile eastward of Île Sacra Ambaka ; it rises near its eastern end to a rocky well-wooded hill, 284 feet ($86^{m}6$) high.

The channel between Île Selonga and Île Sacra Ambaka and the

Charts 604, 1013, 2202a, 2203, 2127.

Chart 634.

southern bank of the river, is obstructed by a shallow bank between the former island and the further shore.

Banc Sainte Esprit, a rocky ledge, fringes the point immediately above Shinkenge, the easternmost white house at Boma; the current sets strongly over and past this ledge.

About 1¾ miles eastward of Boma, the northern bank of the river trends southward for about 2½ miles to the southern extremity of Île des Princes: there is a narrow boat passage between the island and the northern bank.

Directions.—Buoys in Congo river, *see* page 200.—From Passe Nisot, vessels should pass through Chenal de l'Ouest, and northward of Roche Jorgensen and Roches Winton; keeping a beacon near the western end of Île Selonga in line with the flagstaff of the former British consulate at Boma, bearing about 065°.

When the flagstaff of the Port Office at Boma comes in line with the bell-tower of the Residency, bearing about 057°, steer with these marks in line until off Boma.

On approaching Roches Winton, a very strong current with numerous eddies and whirlpools is experienced. After passing the rocks, the current has a tendency to set a vessel away from the southern side of the river, on account of the volume of water flowing through the channel southward of Île Selonga.

Roche Selonga, 7 feet ($2^{m}1$) high, lying close off the north-western side of Île Selonga, should be given a berth of about one cable.

The only danger between Boma and Île des Princes is the shoal extending northward of Île Rocca, which may be avoided by keeping the northern extremity of Île Sacra Ambaka in line with Cul de Boma, bearing 265°.

Boma (*Lat. 5° 51′ S., Long. 13° 03′ E.*) is a well-laid-out town, dating from about the year 1886, and was at one time the capital of the Belgian Congo. There were about 5,000 inhabitants in 1945. It is situated on the northern side of the river at a distance of about 50 miles from the sea, in the centre of a semicircle of hills.

It consists of two portions, Boma Rive the business part on the flat ground close to the river, and Boma Plateau the residential part, situated 190 feet ($57^{m}9$) above the river, where are the official residences, hospitals, barracks, etc.

The land in the vicinity is hilly and covered with coarse grass.

There are two piers at Boma, one opposite the custom-house with a depth of 24 feet ($7^{m}3$) at its head, alongside which larger vessels lie; the other opposite the Port Office with a depth of 17 feet ($5^{m}2$) at its head is used by the Congo State river vessels. A wooden pier at the eastern end of the beach is used for State vessels laying up.

Berths are signalled to incoming vessels from a flagstaff on the pier opposite the Port Office.

A stone wharf, 710 feet ($216^{m}4$) in length, with a depth alongside of 27 feet ($8^{m}2$), has been constructed eastward of the town.

At Boma vessels usually let go the starboard anchor, and then haul in to the river bank or alongside one of the piers and secure with hawsers. In the stream it is necessary to lay out a stern anchor in order to avoid swinging onshore, on account of the sea breeze which blows up the river in the afternoons. Little or no current is felt close in to the river bank during the dry season.

Charts 604, 1013, 2202a, 2203, 2127.

Chart 634.

No bathing should be allowed, as crocodiles abound.

Port facilities.—There are two hospitals at Boma, one for Europeans and the other for natives.

Water from the town supply is laid on at the wharf.

A small supply of patent fuel is available, also limited supplies of fresh beef, potatoes, bread and ice can be obtained.

One 10-ton floating crane is available. Two 5-ton cranes are erected on the wharf, and there is a 5-ton crane on the floating dock. There is also a 20-ton sheerlegs.

A floating dock (*see* Appendix II) belonging to the Congo government is moored to the bank of the river at the lower end of the town.

Small repairs can be effected.

There is one tug and about 30 dumb lighters available.

There is occasional steamship communication with Europe.

Boma is connected to the general telegraph system.

A single-line, narrow gauge railway runs northward for about 62 miles from Boma as far as Tshela (*Lat. 4° 58′ S., Long. 12° 58′ E.*).

Île des Princes to Noqui.—Beacons.—Above Île des Princes the character of the scenery undergoes a change; the river, as far as this point broad and uninteresting, is thence confined within narrower limits by high hills on either side, which for some distance are covered with luxuriant vegetation.

Apparently the depths in the river are considerable all the way to Matadi, a distance of about 30 miles. Although the currents and eddies are stronger than in the lower part of the river, and there are in addition several rocks which are well known to the pilots, there is not much difficulty in reaching Matadi in a steam vessel of good speed.

A number of beacons exist on both sides of the river, between Île des Princes and Noqui, the positions of which are marked on chart 634.

At Binda (*Lat. 5° 51′ S., Long. 13° 12′ E.*) on the northern side of the river, about 5 miles east-north-eastward of the eastern extremity of Île des Princes, there is a factory.

Îlot Oscar is a wooded islet, surmounted by a pyramidal framework beacon, situated in the centre of the river about 4½ miles above Binda. The channel is northward of this islet.

Gango Bongo is a rock which dries about 2 feet ($0^{m}6$) in the low river season, lying in the middle of the river about 2 miles above Îlot Oscar. The channel is northward of this rock.

A triangular beacon, the position of which is approximate, stands on the point about 6½ cables east-south-eastward of Gango Bongo and another on the southern side of the river nearly 2¾ miles farther east-south-eastward; these beacons in line, bearing 108°, lead over Gango Bongo and must be kept open, bearing more than 108°, to pass northward of the rock.

About half a mile above Gango Bongo, Pointe Trident projects from the southern side of the river; also, on the opposite side, a group of two small and one larger islet known as Les Trois Soeurs, lie close in to the northern bank and narrow the channel of the river to little more than three cables between them and Pointe Trident.

Pointe Musuko, on the northern side, lies about 1½ miles above Pointe Trident, the direction of the river here turns sharply north-eastward.

Between Gango Bongo and Pointe Musuko the current is exceptionally strong.

Charts 604, 1013, 2202a, 2203, 2127.

Chart 634.

For a distance of 10 miles from a position about 2½ miles east-north-eastward of the southern extremity of Île des Princes, the southern bank of the river rises steeply to hills 200 to 300 feet ($61^{m}0$ to $91^{m}4$) high; there is vegetation at the foot of these hills, and a few isolated trees may be seen on the skyline, but the hills themselves are generally bare. At a distance of 2 or 3 miles inland of the southern shore opposite Pointe Musuko the land rises to hills about 1,000 feet ($304^{m}8$) high, and is covered with dense vegetation, the intervening country being very rough, with isolated hills and ridges.

Roche Musuko is a rocky islet lying in mid-stream about 4 cables north-eastward of Pointe Musuko; a rock about 2 cables southward of this islet is marked by a beacon.

The northern side of the river above this islet is fringed by some islets and rocks lying parallel with it. Of these, Îlot Kongolo, lies about one mile north-north-eastward of Pointe Musuko, and a rock close northward of it is marked by a beacon; Rochers Kongolo, about half a mile above Îlot Kongolo, consists of a rocky bank extending from the northern shore. The channel leads eastward of the above dangers.

Roches Diamant (*Lat. 5° 52′ S., Long. 13° 23′ E.*), a dangerous rocky bank which covers at high river, lies about 2 cables north-westward of Pointe Diamant on the southern side of the river, at a bend about 2½ miles above Pointe Musuko; the upper rock is marked by a beacon.

Two white triangular beacons on the northern side of the river, in line bearing about 013°, mark the western limit of Roches Diamant, and should be kept open and bearing more than 013°. Two square beacons about one mile farther eastward, situated close off the northern bank and known as Balise Lusi and Balise Sable, when in line bearing about 081°, lead northward of Roches Diamant.

A triangular beacon, the position of which is approximate, stands on the northern side of the river about 11 cables west-north-westward of the southern white triangular beacon indicating the western limit of Roches Diamante and in line with it, bearing about 289°, indicates the southern limit of some rocks extending from the northern bank.

Noqui (*Lat. 5° 52′ S., Long. 13° 26′ E.*), on the southern side of the river about 2½ miles above Pointe Diamant, is a Portuguese settlement in which are several factories and houses. A beacon stands on the bank of the river close southward of the settlement.

There is steamer communication between Santo Antonio de Zaire, Boma, and Noqui.

Steamers occasionally call at Noqui and anchor close in to the bank, but the anchorage is reported to be difficult to approach on account of the strong eddy close inshore.

Noqui is connected to the general telegraph system.

The boundary between Angola and the Belgian Congo lies close eastward of Noqui.

There is a wharf near Noqui, on the Belgian side of the boundary, which is used by vessels which cannot pass through Chaudron d'Enfer (*see* below).

Anchorages.—Between Boma and Noqui, anchorage is reported to be possible at eight places. These are known to the river pilots, and local knowledge is necessary for vessels anchoring in them.

The anchorages are as follows:—Kinlele, on the northern side about 2½ miles above Boma; Île des Princes, off the south-eastern side of

Charts 604, 1013, 2202a, 2203, 2127.

Chart 634.

that island; Bumbu, on the southern side about 1¼ miles above the eastern extremity of Île des Princes; Binda; Îlot Oscar, on the northern side about 3 cables north-eastward of that islet; the anchorages at Binda and Îlot Oscar were reported, in 1945, to be good; Musuko on the northern side about 6 cables westward of Pointe Musuko, two beacons mark this anchorage; Diamant, on the northern side, about 4 cables northward of Roches Diamant beacon; and Ikungulu, on the northern side, about 2¾ miles below Noqui.

Noqui to Matadi.—At Ango-Ango, about one mile above Noqui, is a floating pontoon, alongside which there is a depth of 35 feet ($10^{\mathrm{m}}7$).

A railway begins here and follows the bank of the river to Matadi (*Lat. 5° 49′ S., Long. 13° 27′ E.*), and thence to Léopoldville (*Lat. 4° 20′ S., Long. 15° 15′ E.*), a distance of about 260 miles.

There is one berth alongside for tankers at Ango-Ango.

Pointe Underhill is situated about one mile northward of Ango-Ango.

Opposite Pointe Underhill, the high hills on the northern bank fall 600 to 800 feet ($182^{\mathrm{m}}9$ to $243^{\mathrm{m}}8$) in sheer precipices to the dark gloomy basin below, known as Chaudron d'Enfer. At this point the river is very deep and the current violent; numerous eddies and heavy whirlpools necessitate special caution in steering, and the greater the speed that can be used the better. Although in the dry season, Chaudron d'Enfer is not very formidable, it is said that in December, in the wet season, it fully justifies its name, the current in places attaining a rate of from 10 to 11 knots, *see* page 201. Steering for vessels over 550 feet ($167^{\mathrm{m}}6$) in length would be extremely difficult in Chaudron d'Enfer and, according to the pilots, such vessels would be unmanageable.

At Pointe Underhill a telephone line crosses the river. The lowest part of the curve of the single span of wire is 130 feet ($39^{\mathrm{m}}6$) above high river level.

Matadi.—The limit of navigation for ocean-going vessels is at Matadi, for immediately above that place, at Vivi, the rapids commence. Matadi is situated on the southern bank of the Congo, about 80 miles from the sea, and in 1945 had about 10,000 inhabitants, of whom 400 were Europeans. It is situated on the steep and rocky slope of the river-bank. Shut in on all sides by high mountains, it is extremely unhealthy in the hot season, although there are now few cases of malarial fever.

An Administrator is resident in Matadi.

Most of the external trade of the Congo passes through this port which can receive vessels of up to 550 feet ($167^{\mathrm{m}}6$) in length, drawing 27½ feet ($8^{\mathrm{m}}4$).

Matadi pier, connected to the railway system, is 2,050 feet ($624^{\mathrm{m}}8$) long, with a depth of from 17 to 23 feet ($5^{\mathrm{m}}2$ to $7^{\mathrm{m}}0$) alongside. A continuous line of wharves extends for about half a mile downstream, and which can accommodate about eleven ocean-going vessels, the lower portion being known as Fuca Fuca pier.

Vessels lie alongside the piers or close in to the bank as at Boma. In the dry season there is little current close in, but in the wet season it runs strongly at the upper end of Matadi pier, and sometimes vessels experience considerable difficulty in getting alongside.

Men of war can anchor in Rade de Matadi, a little lower down the river, below the houses at Matadi. A kedge is necessary on the port

Charts 604, 1013, 2202a, 2203, 2127.

Chart 634.

quarter, as the breeze blows up the river with considerable strength in the evening. This anchorage is not recommended.

Port facilities.—There are several electric cranes on the wharves, of from 3 to 7 tons capacity; there is also an electric derrick which can handle loads up to 50 tons.

Diesel oil can be obtained at Ango-Ango.

Fresh meat can be supplied, but the supply of vegetables is limited and uncertain.

There is much sediment in the river water, which must be filtered and boiled before being used for drinking, but drinking water may be obtained alongside the piers.

There are three tugs and about 30 lighters.

There is a European hospital.

Matadi is connected to the general telegraph system.

There is regular steamship communication with Europe.

Matadi is connected with Léopoldville by rail.

Local weather.—Heavy thunderstorms and torrential rains fall in the wet season. Tornadoes are frequent, and land and sea breezes are marked.

Above Matadi.—Vivi (*Lat. 5° 58′ S., Long. 13° 28′ E.*), about 2 miles above Matadi, and on the opposite bank of the river, may be identified by the remains of a fort. A pulling boat can ascend the river to this point, but great care is required, and local knowledge is necessary as it is at the foot of the rapids.

Charts 604, 1013, 2202a, 2203, 2127.

CHAPTER VI

CONGO RIVER TO RIO CUNENE

CLIMATE AND WEATHER.—*See* page 55.

Chart 604.

PONTA DA MOITA SÊCA TO MORRO DAS LAGOSTAS.—Aspect.—The coast from Ponta da Moita Sêca, *see* page 195, trends south-south-eastward for about 170 miles to Morro das Lagostas. The land within is of moderate elevation, and higher than that northward of the Congo; in some places it is wooded, whilst in others, bare hills are covered with isolated clumps of trees; also the coast becomes more rocky, and in places is composed of reddish cliffs; in the southern part it is backed by a range of hills.

Coast.—About 3 miles southward of Ponta da Moita Sêca red cliffs appear, and form the coast for many miles southward; inland of these cliffs, a tableland runs parallel to the coast in a continuous double line, which is easily identified when it has once been seen, although the regularity of the unbroken line of cliffs, which extend for 34 miles to Snake's head, is such that no definite landmark can be observed.

Cape Deceit (*Lat. 6° 24′ S., Long. 12° 25′ E.*), situated about 18 miles south-south-eastward of Ponta da Moita Sêca, is a slight projection which probably owes its name to having been mistaken for that point.

Margate head is situated about 10 miles south-south-eastward of Cape Deceit, and between them is a slight indentation. The head is a rounded projection with a rocky base; it is surmounted by a moderately high hill, when high land continues south-south-eastward for about 30 miles.

Ponta Mangue (Mankwe) Grande is situated about 9 miles south-south-eastward of Margate head, and between them is a sandy bay, with a rocky headland near its centre. Ponta Mangue Grande consists of lofty cliffs surmounted by shrubs and overlooked by a hill, the summit of which is round and bare.

About one mile southward of the point is the mouth of Rio Lucula; and within the point is a remarkable clump of mangroves, which, being visible at a distance of about 15 miles, serves to indicate the position of Massemodom factory, situated a short distance southward of it.

Snake's head, situated about 1½ miles south-south-eastward of Ponta Mangue Grande, is not easily distinguished, and can only be identified by the adjacent clump of mangroves.

Charts 1013, 2202a, 2203, 2127.

Chart 604, plan of Vesuvius shoal.

Light.—Cabeça de Cobra light is exhibited, at an elevation of 131 feet (39^{m}9), from a white square masonry tower, 43 feet (13^{m}1) in height, on the coast about 2 miles south-south-eastward of Margate head, *see* view facing page 224. A small white dwelling stands close northward of the lighthouse.

Dangers.—Between Margate head (*Lat. 6° 31′ S., Long. 12° 31′ E.*), and a position on the coast about 2 miles south-south-eastward of it, the coast is fronted by a shoal which extends in a south-westerly direction for about 2 miles. On this shoal are several heads, of which, Hydra bank has a depth over it of only 6 feet (1^{m}8). There is a depth of 3 fathoms (5^{m}5) at the outer end of the shoal.

Vesuvius shoal, over which there is a least depth of 2½ fathoms (4^{m}6), lies about 3¼ miles south-westward of Margate head, and about one mile in the same direction from the extremity of the shoal extending from that head; between the two shoals there are depths of from 4 to 5 fathoms (7^{m}3 to 9^{m}1).

Chart 604.

A shoal, with a depth of 2¼ fathoms (4^{m}1) over it, the position of which is doubtful, was (prior to 1863) reported to lie about 3 miles offshore about 5 miles southward of Margate head.

Shoal water was (prior to 1884) reported to extend for a distance of 2½ miles from the coast between Massemodom factory and the village of Mangue Grande; in fact, between Ponta da Moita Sêca and Foreland bluff, a distance of about 80 miles, it is shoal near the coast, and depths of from 4 to 6 fathoms (7^{m}3 to 11^{m}0) will be found at a considerable distance offshore.

Caution.—Great caution should therefore be exercised when navigating in this vicinity; soundings should be taken continuously, and vessels should not get into depths of less than 8 fathoms (14^{m}6), as it may be shoaler than is indicated on the charts. Rollers often come on without warning, and frequently break in depths of 5 fathoms (9^{m}1). *See* page 35.

Coast.—From Ponta Mangue Grande the coast trends south-eastward for about 23 miles, to the mouth of Rio Lucunga at the northern end of Baia Funta, the northern portion of the intervening coast presenting an uninterrupted sandy beach for a distance of 16 miles. Behind this beach are rocky cliffs, surmounted by bare rounded hills.

At about 7 miles north-westward of the mouth of Rio Lucunga, the cliffs approach the water's edge for a short distance, southward of which the coast consists of a sandy beach as far as the mouth of the river. In the vicinity of these cliffs, shoal water was (prior to 1884) reported to extend about one mile from the coast. There are two factories at Quincongue (Kakongo), situated at the foot of a hill about 11 miles south-eastward of Snake's head (*Lat. 6° 40′ S., Long. 12° 36′ E.*), but they are not easily discernible from seaward; at a short distance southward of them there is a clump of trees. The factories of Quinzau (Kinzao) are situated about 5 miles south-eastward of Quincongue, and at about 2 miles northward of the mouth of Rio Lucunga, is Missanga factory.

Baia Funta.—This bay is a slight indentation southward of the mouth of Rio Lucunga; being open to south-westerly winds it affords no shelter, *see* view facing page 216. The mouth of Rio Lucunga is indicated by some clumps of trees close to the beach, and shoal water

Charts 1013, 2202a, 2203, 2127.

Chart 604.

was reported by H.M.S. *Swallow* in 1879 to extend about 2 miles seaward of it. The white factories of Mucula (Mocula) are situated about half a mile south-eastward of the mouth of Rio Lucunga.

Shoal.—A shoal, with a least depth of 4½ fathoms ($8^{m}2$), runs parallel to the coast and about 5 miles offshore with its centre about 5½ miles south-westward of the mouth of Rio Lucunga. In about 1885 this shoal was crossed with the factory northward of Mucula bearing 088°, when the least depth obtained was 8 fathoms ($14^{m}6$), but discoloured water was observed southward.

Anchorage.—Vessels with local knowledge approaching Mucula, inshore of the shoal described above, should not shoal the depths to less than 5 fathoms ($9^{m}1$) until the factories bear 085°, when they may be steered for, and a berth taken in about 3½ fathoms ($6^{m}4$). There is a depth of 3 fathoms ($5^{m}5$) close to in the factories. Landing is difficult during the months of June to September and should not be attempted in a ship's boat.

Coast.—From the mouth of Rio Lucunga, the coast trends southward for about 16 miles to the mouth of Rio M'Bridge; the northern half consists of a sandy beach and the southern of low rocky cliffs. These cliffs are intersected by ravines, probably the beds of torrents, and are of a yellowish red colour which contrasts strongly with the blue of the sea and the green of the country inland. At a short distance inshore of the northern end of these cliffs, is a moderately high hill, known as Mount Funta, which is the last prominent elevation rising above the coastline in the direction of Rio M'Bridge.

Chart 604, plan of Ambrizete.

Ponta Palmas, the northern entrance point of Rio M'Bridge, is wooded, its dark hue contrasting strongly with the yellowish tint of the cliffs on the southern bank of the river. The mouth of the river is fronted by breakers which extend seaward for about 3 cables; the river is only available to native craft. Southward of the river, the coast is composed of low cliffs, on the level summit of which are here and there some thick clumps of trees. Inland of the mouth of the river is a range of hills, the highest and southernmost of which is Mount Couza.

Ambrizete.—Foreland bluff is a high, almost perpendicular, cliff, covered with herbage and situated about 4½ miles southward of the mouth of Rio M'Bridge. When seen from southward, the bluff projects seaward, and can, in clear weather, be recognised at a distance of about 15 miles; but when viewed from northward it is less prominent. Within the headland, there is a range of hills, the southernmost and highest of which, from its flat top, is known as the Table of Juma, and is not only the best mark for making Ambrizete, but may be easily identified at a distance of about 25 miles; *see* view facing page 216. The Table of Juma is not shown on the chart.

Between Rio M'Bridge and Foreland bluff (*Lat. 7° 17′ S., Long. 12° 55′ E.*), is a slight indentation, on the shore of which is Ambrizete. This settlement is situated, about 2 miles southward of the mouth of the river, on the rising ground stretching in the direction of the bluff. Approaching from southward the factories are not visible until they bear more than 045°. *See* view facing page 216.

A rocky shelf, on which the depths are less than 3 fathoms ($5^{m}5$) fronts the coast from Ambrizete to Foreland bluff and extends about

Charts 1013, 2202a, 2203, 2127.

Chart 604, plan of Ambrizete.

1½ miles offshore. When passing the bluff an offing of from 1½ to 2 miles should be maintained.

In 1930 the s.s. *Ingo*, drawing 19 feet ($5^{m}8$), when coming to an anchor, touched bottom in a position about 1¼ miles north-westward of Foreland Bluff light-structure.

Light.—Ambrizete light is exhibited, at an elevation of 128 feet ($39^{m}0$), from a white square masonry tower, 66 feet ($20^{m}1$) in height, on the extremity of Foreland bluff (*Lat. 7° 16′ S., Long. 12° 55′ E.*). A small white dwelling stands close westward, and a disused light-structure close northward, of the lighthouse. *Note.* The new lighthouse only is shown on the view facing page 224.

Anchorage.—Vessels with local knowledge only should approach this anchorage. The best berth is off the mouth of Rio M'Bridge, in a depth of 5 fathoms ($9^{m}1$), with the British factory bearing 120°. Southward of this bearing, the bottom changes from sand and mud to rock and stones, and the depths shoal considerably. The ocean swell is uninterrupted, and the consequent rolling of the vessel makes the anchorage uncomfortable. Rollers frequently break off Ambrizete in a depth of 5 fathoms ($9^{m}1$). Owing to the constant heavy surf, landing is only practicable in surf-boats; the surf is heaviest from May to October, and attains its maximum two or three days before the spring tides.

Chart 604.

Coast.—Baia de Juma is a slight indentation in the coast south-eastward of Foreland bluff; it extends for about 5 miles, and in its southern part there is a sandy beach about 3 miles in length; from the northern part of the bay an unbroken line of cliffs rises to the bluff. Ambrizete river flows into the northern part of the bay, and its mouth, which is barred with sand, is about a quarter of a mile wide. *See* view facing this page.

The neighbourhood of Baia de Juma abounds in fish in depths over 9 fathoms ($16^{m}5$); the best depths for fishing being from 18 to 20 fathoms ($32^{m}9$ to $36^{m}6$), coral and gravel.

From the southern end of Baia de Juma, the general trend of the coast is south-south-easterly; it is bold and cliffy with occasional sandy coves, and trees surmount the high white cliffs, the tops of which latter show up in serrated outline. There are depths of from 8 to 10 fathoms ($14^{m}6$ to $18^{m}3$) at distances of from 2 to 3 miles offshore.

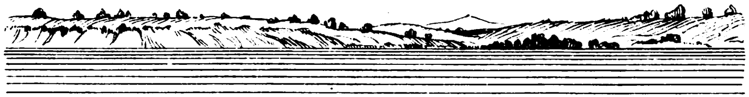
Double-headed cliff (*Lat. 7° 34′ S., Long. 13° 03′ E.*) is a slightly projecting point situated about 18 miles south-south-eastward of Foreland bluff and near the northern entrance point of a small bay. The shores of the bay are low, but at its southern point cliffs rise abruptly to a considerable height, and are distinguished by a cross erected on their summit. The factories of Musserra are situated near this bay; the coast in the vicinity of these factories is foul for a short distance offshore. Northward of Musserra and about half a mile offshore, there is a shoal which dries.

At a distance of about 6 miles south-south-eastward of Double-headed cliff, the cliffs are succeeded by a sandy beach which extends for about 4 miles to Ponta Two Tree whilst at about 2 miles further in the same direction is the mouth of Rio Sembo.

Anchorages.—Anchorage may be obtained by vessels with local

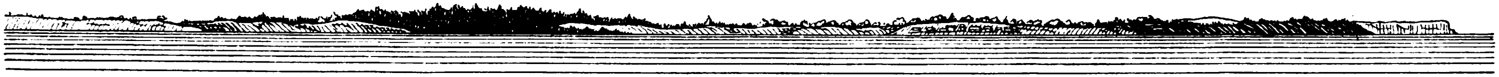
Charts 1013, 2202a, 2203, 2127.

To face page 216.


Mouth of Rio Lucunga.

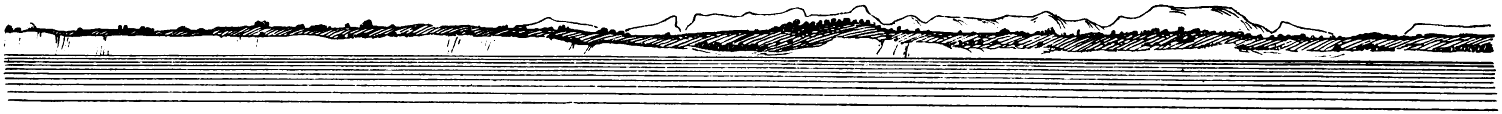
Baia Funta from westward.

(*Original dated* 1871.)


Mouth of Rio M'Bridge, bearing 096°.
Factories.
Foreland bluff, bearing 143°, distant 6 miles. (Lighthouse not shown on view.)

Ambrizete from north-westward.

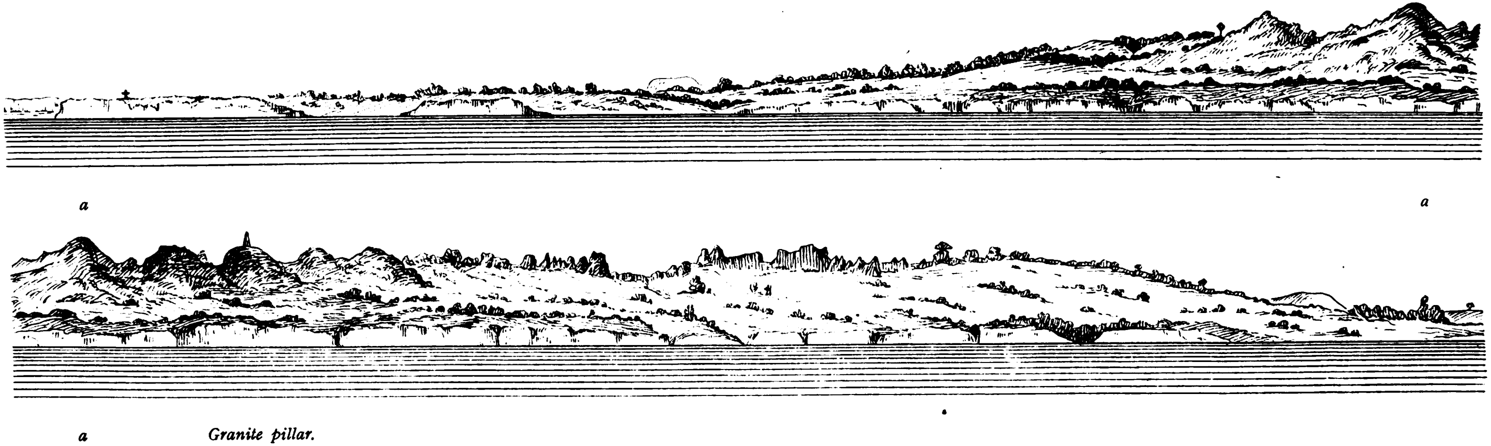
(*Original dated* 1889.)


Foreland bluff.
Table of Juma (not shown on chart).

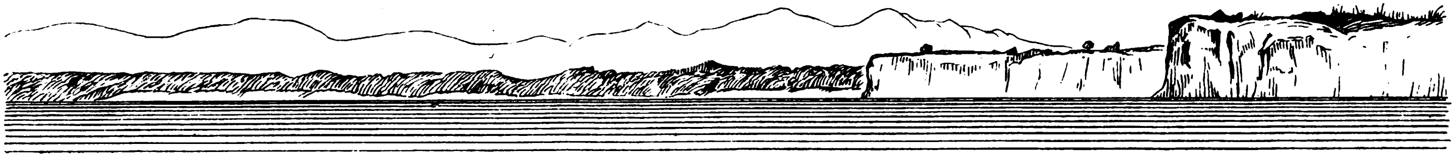
Coast southward of Foreland bluff from south-westward.

(*Original dated* 1871.)

To face page 217.



View, in two parts, of the Ararat hills from westward.
(*Original dated* 1871.)



Baia do Dande from south-westward.
(*Original dated* 1871.)

Chart 604.

knowledge in Baia de Juma, but it is not good, the bottom being very foul, whilst a heavy swell sets in and causes considerable surf on the beach. Landing cannot be effected in a ship's boat, which should remain outside the surf until a canoe comes off.

Vessels with local knowledge should not anchor off Musserra in depths of less than 9 fathoms ($16^{m}5$), which will be found about 2 miles offshore. Inside these depths, the bottom is rocky. From the anchorage, the pillar on the Ararat hills, *see* below, bears 116°.

Ararat hills.—These hills rise inland and a little southward of Double-headed cliff, and run parallel with the coast for 5 or 6 miles. They are steep, of basaltic formation, and except for a little brushwood, are bare; these hills are the highest elevations between the Congo river and Luanda, *see* page 221, and are brown and arid in appearance, contrasting strongly with the verdant country southward of Rio Sembo. Though the surrounding country is open, with detached groves of trees here and there, the hills are covered with superb masses of a pink-coloured granite which rise in picturesque forms. On the summit of the northernmost hill, situated about 23 miles southward of Foreland bluff and 4 miles inland, one of these masses of granite rises in the form of a pillar, about 60 feet ($18^{m}3$) in height which is very remarkable from seaward and has the appearance of an artificial erection; it is visible in clear weather at a distance of 18 or 20 miles, and is an excellent landmark. *See* view facing this page.

On the southern slope of the Ararat hills there are two villages, the southern of which, situated abreast the sandy beach about 2 miles northward of Rio Sembo, is very prominent, as its conical huts are much lighter in colour than the dark trees in the background.

Coast.—Ponta Two Tree, situated about 11 miles southward of Double-headed cliff, is a low, sloping, grassy point on which are two most remarkable isolated palm trees, one near the point and the other about 1½ cables further inland.

Rio Sembo (*Lat. 7° 45′ S., Long. 13° 07′ E.*), is apparently an insignificant stream, and its northern entrance point is low and wooded. From January to June the mouth of Rio Sembo is situated just northward of Quicembo, and landing is then effected by entering the river and landing at the factories. During the remaining months of the year the river is closed by a barrier of sand, on which landing can only be effected in surf-boats.

The remarkable white-washed factories of Quicembo stand on the summit of Ponta Quicembo, at about 11 miles southward of the granite pillar on the Ararat hills. The bluff is a perpendicular whitish cliff which extends for about one mile and is succeeded by a sandy coast which stretches for 5 miles to the mouth of Rio Logé.

Anchorage.—There are no known dangers off Quicembo, and there is good anchorage nearer to the beach than is usually the case along this coast; local knowledge is necessary.

Chart 604, plan of Pôrto Ambriz.

Pôrto Ambriz.—**Caution.**—According to determinations by the Portuguese Government, this bay is situated about 4 miles 300° from its charted position. The correct position is as given on the plan on chart 604; and also in this volume.

Pôrto Ambriz is a slight indentation in the coast, extending from Ponta Logé, situated about 5 miles south-south-eastward of Ponta

Chart 604, plan of Pôrto Ambriz.

Two Tree to Ponta Ambriz, situated about the same distance further southward.

Ponta Logé is somewhat ill-defined, being a low sandy point ; it is fringed by a bank on which the sea always breaks.

Rio Logé is an unimportant stream which flows into the head of the bay about 1½ miles northward of Ponta Ambriz ; its position is indicated by some unusually light green lofty trees and a wooded hummock ; its mouth is barred, and will scarcely admit small boats, but within there is a depth of 12 feet ($3^{m}7$). The river is said to be navigable nearly to its source.

Ponta Ambriz (*Lat. 7° 50′ S., Long. 13° 06′ E.*), is a high, white, perpendicular cliff which, when first seen from seaward, appears as three wooded hummocks. As the land near the coast for some distance northward is low, this headland assumes, especially in misty weather, the appearance of being detached.

A shoal spit, over which the depths are 2½ fathoms ($4^{m}6$) and less, extends in a north-north-westerly direction for about 11 cables from Ponta Ambriz.

The factories of Ambriz are situated on Ponta Ambriz ; and there is a small pier, alongside which native craft sometimes lie, under the shelter of the highest part of the headland.

There is occasional steamship communication with Europe, and with other ports in Angola.

Fish do not frequent the bay, save in the mornings at the entrance to the river, where, at that time, the seine may be used to advantage ; but about 12 miles offshore there are good fishing grounds.

Inland of Ponta Ambriz there is much marshy ground which renders the port very unhealthy.

Light.—Signal station.—A light is exhibited, at an elevation of 119 feet ($36^{m}3$), from a white square masonry tower, with a cross on the seaward side of its upper part, 46 feet ($14^{m}0$) in height, situated about 2½ cables north-eastward of the western extremity of Ponta Ambriz (*Lat. 7° 50′ S., Long. 13° 06′ E.*) ; *see* view facing page 224. A disused light-structure stands close to the lighthouse. There is a signal station at Ambriz with which communication can be maintained by means of the International Code of Signals.

Anchorage.—The best anchorage is in depths of 9 or 10 fathoms ($16^{m}5$ or $18^{m}3$), mud, with the light-structure bearing 114°, and the mouth of Rio Logé about 074° ; vessels can also anchor closer in, in depths of about 7 fathoms ($12^{m}8$), with the light-structure bearing 135°, and the mouth of Rio Logé about 083°.

When approaching the anchorage from northward, the Ararat hills, the granite column, and Ponta Two Tree are excellent marks ; but Ponta Logé must be given a berth of at least 2 miles, and the anchorage may be steered for when the light-structure bears 114°.

When approaching the anchorage from southward, Ponta Ambriz (*Lat. 7° 50′ S., Long. 13° 06′ E.*), must be given a berth of at least 2 miles, as the sea frequently breaks off the point in a depth of 5 fathoms ($9^{m}1$). This precaution must be observed, even by small vessels.

In order to effect a landing from the anchorage, boats should steer for the entrance to the river, but should on no account attempt to cross its bar ; when within half a cable of the beach they should follow the shore southward, towards the extremity of the cliff of

Chart 604, plan of Pôrto Ambriz.

Ponta Ambriz, and then make for the pier. It is necessary to follow the above directions, because on the shoal off Ponta Ambriz, notwithstanding the depth, there is sometimes a sufficiently heavy swell to capsize or swamp a boat, and, during the continuance of rollers, the sea breaks all along the shoal. When the rollers are heavy, landing is impossible.

Chart 604.

Coast.—Capulo (Little Mazula), is situated in Baia do Capulo (Little Mazula) about 7½ miles south-south-eastward of Ponta Ambriz ; a small stream, known as Rio Uezo, flows into the head of the bay, which is barely one mile across between its rocky entrance points.

Mount Bamba, a hill with a rounded summit and sloping sides, which, on an easterly bearing, appears detached from the other hills in its vicinity, is situated about 2 miles inland, eastward of the bay. The coast in this locality presents an arid appearance, with here and there a clump of trees.

Mussulo or Baia de Mussulo Grande is situated about 16 miles southward of Baia do Capulo, the intervening coast being composed of white cliffs of uniform height, fringed nearly the whole way by a reef extending about one mile offshore. The southern end of this reef is at the mouth of Rio Onzo, which flows into Baia de Mussulo. The mouth of the river is indicated by a deep fissure in the cliffs, forming a valley which is filled with a mass of dark verdure. Running parallel with and at a short distance within the coast is a range of hills, irregular in outline ; whilst at about 10 or 11 miles inland are the peaks of the Mussulo hills, which form an excellent landmark.

The village of Mussulo Grande, with some factories near it, is visible from seaward.

From Baia de Mussulo, the coast preserves its cliffy character for a distance of about 8 miles, in a south-south-easterly direction, to Rio Lifune ; the mouth of this river is distinguished by masses of lofty trees which line the coast for some distance and contrast strongly with the red colour of the land.

Anchorages.—Anchorage may be obtained by vessels with local knowledge off the village in Baia do Capulo in depths of 7 or 8 fathoms (12^{m}8 or 14^{m}6).

Anchorage may be obtained by vessels with local knowledge in Baia de Mussulo in depths of 8 or 9 fathoms (14^{m}6 or 16^{m}5).

Charts 604, 627.

Baia do Dande.—Shoal.—The northern entrance point of Rio Lifune is also that of Baia do Dande, which extends thence to Ponta do Dande, situated about 8 miles in a south-south-westerly direction. This bay is divided, near its centre, into two sandy indentations, by Ponta Bluff (*Lat. 8° 26′ S., Long. 13° 22′·E.*), which is high and rocky, and appears perpendicular when seen on an east-north-easterly bearing ; behind the sandy beaches of the two bights, rises a chain of hillocks with trees in the valleys between them. There is a village on the northern side of Ponta Bluff. *See* view facing page 217.

Cyclops shoal is a sandy shoal on which H.M.S. *Cyclops*, drawing about 16 feet (4^{m}9), grounded in 1849 ; it is situated about 1¾ miles north-eastward of Ponta do Dande.

Ponta do Dande is the sloping base of steep, lofty cliffs, and appears at a distance as a bold headland. These cliffs continue eastward,

Charts 1013, 2202a, 2203, 2127.

Charts 604, 627.

along the southern side of Baia do Dande, for a distance of about 2 miles, to the southern bank of Rio Dande, the entrance to which is indicated by some trees. The river is said to be navigable by small sea-going vessels for some distance above the town of Dande, which is situated on its right bank about 20 miles up river. A considerable trade is carried on between this river and Luanda.

Anchorage.—Anchorage can be obtained by vessels with local knowledge off the mouth of Rio Dande, in depths of from 6 to 8 fathoms ($11^{m}0$ to $14^{m}6$).

Baia de Bengo.—From Ponta do Dande the coast trends south-south-eastward for about 8 miles to Ponta Spilimberta (*Lat. 8° 35′ S., Long. 13° 21′ E.*), the northern entrance point of Baia de Bengo, and consists of high red and white cliffs; thence the shore recedes in a south-easterly direction, preserving its cliffy character, for about 6 miles to the commencement of the sandy beach which forms the head of Baia de Bengo.

From Ponta Spilimberta to Morro das Lagostas on the south-western entrance point of the bay, the distance is about 10½ miles in a south-south-westerly direction; and about 2½ miles within the latter point is Ponta de Bengo. At a short distance inland the bay is backed by hills which extend as far southward as Ponta de Bengo. At the head of the bay, about 6 miles north-eastward of Ponta de Bengo, is the mouth of Rio Bengo, the position of which is indicated by some trees on the beach, as well as by a high hill eastward of it.

The town and fort of Cacuaco, is situated near the shore, about midway between the mouth of the river and Morro das Lagostas.

Anchorage.—Baia de Bengo is clear of any known dangers. The depths diminish gradually towards the shore, but are deepest on its southern side. Anchorage may be obtained by vessels with local knowledge in a depth of about 14 fathoms ($25^{m}6$), with Morro das Lagostas bearing 209°, and the fort at Cacuaco bearing 164°; also in about 16 fathoms ($29^{m}3$), within a mile of the cape; or further in towards the shore, in about 7 fathoms ($12^{m}8$), with the same fort bearing 164°.

Chart 604, plan of Baia de Luanda.

Morro das Lagostas.—Light.—The point on which is Morro das Lagostas is not only the southern entrance point of Baia de Bengo, but also the northern entrance point of the port of Luanda, and terminates in a perpendicular cliff of yellowish tint, surmounted by trees; at its base are some black above-water rocks, but the point is steep-to, and may be approached to a distance of 2 cables. *See* views facing page 222.

The coast between the mouth of Rio Bengo and the point begins to rise about 4 miles from the latter in red and white cliffs which, when seen from northward, are in remarkable contrast with the low land at the head of the bay.

A light is exhibited, at an elevation of 216 feet ($65^{m}8$), from a white square masonry tower, surmounted by a smaller tower and a cross, 46 feet ($14^{m}0$) in height, with some dwellings nearby, situated on the summit of Morro das Lagostas (*Lat. 8° 45′ S., Long. 13° 18′ E.*). *See* view facing page 224.

The light-keepers' dwellings are close to, and on either side of, the lighthouse, but the lighthouse itself is partly hidden by trees.

Charts 1013, 2202a, 2203, 2127.

Chart 604, plan of Baia de Luanda.

LUANDA.—Light.—This port is situated south-westward of Morro das Lagostas, and is protected on its seaward side by Ilha de Luanda and the reef of the same name, the former of which is low and sandy.

From Morro das Lagostas the coast trends in a south-westerly direction for about 5½ miles to the head of the harbour.

Fortaleza do São Pedro da Barra, which is low and formed by a cutting in the solid cliffs, has a double tier of gunports ; it is situated about 1½ miles south-westward of Morro das Lagostas ; close to the fort there is a cenotaph.

A light is exhibited, at an elevation of 141 feet ($43^{m}0$), from a white square stone tower, 15 feet ($4^{m}6$) in height, near Fortaleza do São Pedro da Barra.

Fortaleza do Penedo is a fort erected on a rock at the water's edge, about 2¾ miles south-westward of São Pedro da Barra, and about 4 cables further westward a quay, *see* page 222, extends in a north-north-easterly direction from Ponta da Mai-Isabel, which is low and sandy.

Between Ponta da Mai-Isabel and Fortaleza do São Pedro da Barra, shoal water extends from 3 to 5 cables offshore.

On Ilha de Luanda, about 11 cables north-westward of Ponta da Mai-Isabel, is the Portuguese Marine Depot. Near the north-eastern end of the island is the light-structure, which is a good mark.

The coal depot, with its deep water quay, off which are some mooring buoys, is situated about 12 cables north-north-westward from Fortaleza do Penedo. At about 1¼ miles south-westward of the Marine depot, a bridge connects the island with the mainland.

That portion of the harbour lying south-westward of a line joining Ponta da Mai-Isabel and the Marine depot is shoal.

Aspect.—On approaching Luanda from northward, the first land to be identified will be the fine bold cliff at Morro das Lagostas with its lighthouse, and then Fortaleza do São Miguel, with the upper part of the town ; the yellow hospital, which has a wide road leading to it, being most prominent.

The masts of the radio stations at Luanda are conspicuous, especially those of framework on top of the cliffs about 5 cables south-eastward of Ponta da Mai-Isabel (*Lat. 8° 48′ S., Long. 13° 14′ E.*).

As Morro das Lagostas is neared, the low land of Ilha de Luanda with its clumps of trees, together with the light-structure on its north-eastern end, will be seen.

When approaching from the southward, Fortaleza de São Miguel may be seen in clear weather at a distance of 16 to 18 miles ; it then assumes the appearance of being white and standing on a high promontory.

Ilha de Luanda will not be identified until much closer in.

Along the low foreshore, between Ponta das Palmeirinhas (*see* page 224) and Ilha de Luanda, there are scattered palm trees.

Recife de Luanda.—Light-buoy.—This shoal extends about 9 cables in a north-north-easterly direction from the north-eastern extremity of Ilha de Luanda ; it has a least depth of 2¼ fathoms ($4^{m}1$) over it, but the sea seldom breaks upon it, and thus the utmost caution is necessary when approaching it from either side. The north-eastern extremity of the shoal is steep-to, and lies about 2 miles

Chart 604, plan of Baia de Luanda.

westward of Morro das Lagostas, the space between forming the entrance to the harbour. It was reported, in 1948, that this shoal had extended. A light-buoy, No. 1, painted black and exhibiting a *green flashing* light *every three seconds*, is moored off the north-eastern extremity of Recife de Luanda.

A beacon, consisting of an obelisk situated on the ridge about 1¾ miles south-south-westward of Morro das Lagostas, bearing 156°, and well open eastward of Fortaleza de São Pedro de Barra, leads about 3½ cables eastward of the north-eastern extremity of Recife de Luanda. This beacon is liable to be overgrown by bushes, but was clearly visible in 1931.

Lights.—Light-buoys.—A light is exhibited, at an elevation of 34 feet (10^{m}4), from a white square concrete tower, 30 feet (9^{m}1) in height, situated near the north-eastern extremity of Ilha de Luanda (*Lat. 8° 46′ S., Long. 13° 15′ E.*).

A light is exhibited on the western side of the channel leading to Luanda, at an elevation of 15 feet (4^{m}6) from a white iron tower with black bands, on a concrete base 21 feet (6^{m}4) in height, situated on Pedras de Mai-Isabel. These rocks dry 6 feet (1^{m}8), and lie about 2 cables north-north-westward of Ponta da Mai-Isabel.

A light is exhibited, at an elevation of 13 feet (4^{m}0) from an iron standard at each end of the two extremities of the floating landing stage at the head of the custom-house pier at Luanda.

A light is exhibited, at an elevation of about 230 feet (70^{m}1), from the black triangular box from which a time signal is made at the observatory.

The dredged channel leading to the custom-house at Luanda is marked on the western side by four light-buoys, Nos. 3, 5, 7 and 9, each exhibiting a *green flashing* light.

A light-buoy, No. 2, exhibiting a *red flashing* light is moored about 1¼ cables east-north-eastward of the head of the quay.

Wharves. — Depths. — Dredged channel. — A quay, about 525 feet (160^{m}0) in width, extends about 4½ cables north-north-eastward from the former Ponta da Mai-Isabel; its western side continues from the point in a south-south-westerly direction for about three-quarters of a mile and constitutes the eastern side of the channel leading to the custom-house. In 1948 there were depths of from 18 to 32 feet (5^{m}5 to 9^{m}8) alongside the western side of the quay for a distance of nearly 2½ cables from its outer end, and 32 feet (9^{m}8) alongside the eastern side for a distance of about 1½ cables from its outer end.

The wharves are only available for small craft. There are two 5-ton cranes at Custom House wharf, and an 8-ton crane on the quay at Ponta da Mai-Isabel.

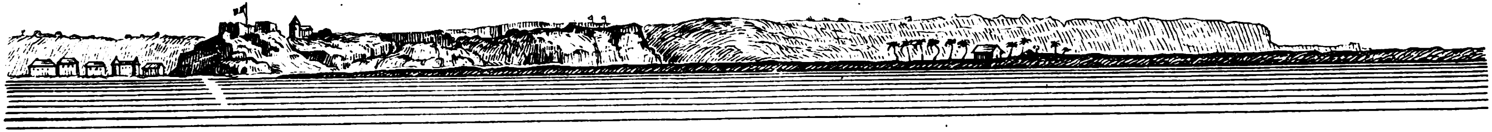
In 1939, the channel leading from the head of the harbour to the wharves at the town was dredged to a depth of 8 feet (2^{m}4), over a width, between the buoys, of 98 feet (29^{m}9).

Directions.—The entrance to Luanda should be approached with Morro das Lagostas light, bearing not less than 113°.

When Fortaleza de São Pedro da Barra bears not less than 156°, it should be steered for, with the beacon, if visible, open eastward of it, until the tower of the observatory bears 226°.

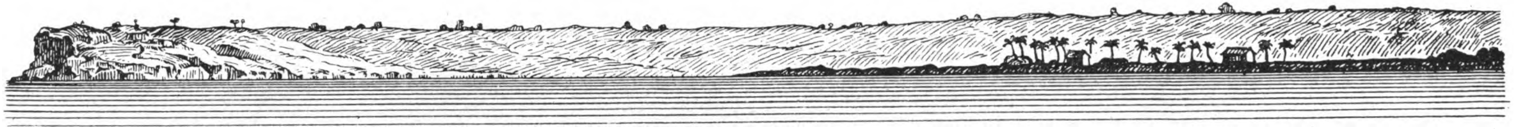
This last bearing will lead up the centre of the harbour to the anchorage.

Charts 627, 1013, 2202a, 2203, 2127.



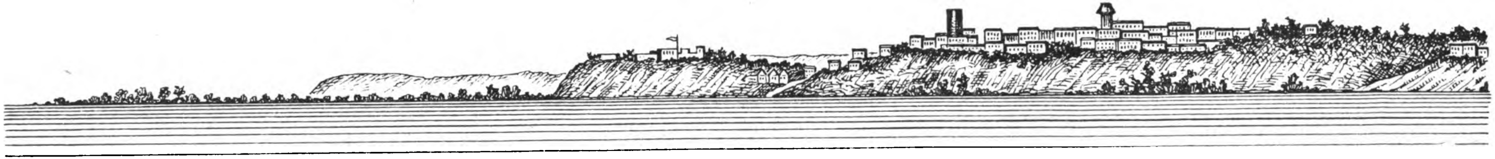
Luanda from north-north-westward.

(*Original dated* 1871.)


Morro das Lagostas.
Entrance to harbour.
North-eastern extremity of Ilha de Luanda, bearing 087°.

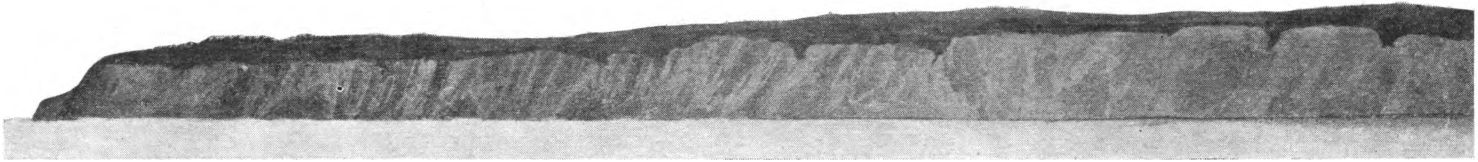
Luanda harbour entrance from westward.

(*Original dated* 1871.)


Ilha de Luanda.
Morro das Lagostas (lighthouse not shown).
Fortaleza de São Miguel, bearing 072°, distant 5 miles.
Observatory.
Government house.
Hospital.

Luanda from south-westward.

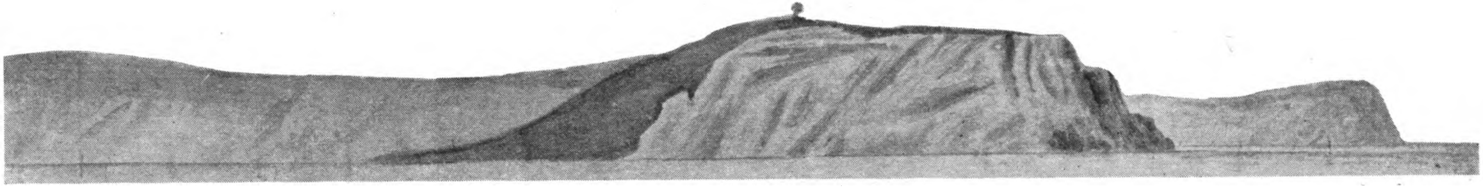
(*Original dated* 1886.)



Cabo Ledo,
bearing about 348°, *distant* 7 *miles.*

Coast southward of Cabo Ledo.

(*Original dated* 1812.)



Cabo de São Braz, bearing 135°, *distant about* 9 *miles.*

Coast in the vicinity of Cabo de São Braz.

(*Original dated* 1812.)

Cabo de São Braz,
bearing about 338°, *distant* 17 *miles.*

Coast southward of Cabo de São Braz.

(*Original dated* 1871.)

Chart 604, plan of Baia de Luanda.

On the western side of the harbour the shore of Ilha de Luanda is steep-to, and may be approached accordingly.

Current.—About Luanda and Ponta das Palmeirinhas (*Lat. 9° 04′ S., Long. 13° 00′ E.*) the current has been known to set eastward, or directly on to the coast, at the rate of 15 or 20 miles a day; and although this indraught is not constant, it is by no means infrequent.

Pilotage.—For pilotage regulations, *see* page 48.

Anchorage.—The anchorage at Luanda is one of the best on the west coast of Africa, southward of the Equator; the water is smooth at all times, and the holding ground is good.

Vessels should anchor in a depth of about 12 fathoms ($21^{m}9$), about 3 cables north-north-eastward of the light-structure on Pedras de Mai-Isabel (Lat. *8° 48′ S., Long. 13° 14′ E.*).

When a high south-westerly wind prevails the sea breaks over part of Ilha de Luanda and drives large quantities of sand into the harbour, which is gradually filling up. Great quantities of soil are also washed down from the heights during the rainy season, so that the part of the harbour that was at one time sufficiently deep for large vessels to approach close to the custom house now dries.

Luanda.—This town is not only the capital of Angola, *see* page 9, but is also the principal city of the Portuguese dominions in West Africa. It had a population, in 1946, of 66,932, of whom 9,487 were Europeans. It stands at the head of the bay and is conspicuous from seaward. The town is built upon two different levels.

The lower town skirts the shore at the head of the bay, and is occupied by the mercantile community. The town hall, with its slate roof and red dome, is prominent. The upper town is naturally the healthier part, and in it are the principal official residences.

In addition to the forts already mentioned, that of São Miguel, which is used as a signal station, stands on an elevation at the western end of the upper town and is easily identified from seaward. *See* views facing page **222**.

The observatory, from which a time signal is made, has a square white tower, and is situated a short distance southward of São Miguel fort (*Lat. 8° 49′ S., Long. 13° 13′ E.*).

British Consular Officers reside at Luanda.

Climatic table.—*See* page 75.

Quarantine.—Vessels entering without a clean bill of health, or with any contagious sickness on board, must exhibit a yellow flag at the foremast; the quarantinable diseases are yellow fever, cholera, typhoid fever, small-pox, and measles. Health certificates must bear the signature of the Portuguese Consul of the port at which they have been obtained, failing which a vessel will be placed in quarantine. Intermittent fevers are prevalent throughout the year at Luanda, February, March, and April being the worst months. From October to April, the natives are subject to periodical epidemics of small-pox of a virulent kind.

From time to time, owing to some unknown cause, fish of all sizes die, both inside the harbour and out at sea; they are washed up on the spit in great quantities, and the odour to leeward of their decaying bodies is almost unbearable.

Port facilities.—A moderate stock of coal is usually maintained at Luanda.

Charts 627, 1013, 2202a, 2203, 2127.

Chart 604, plan of Baia de Luanda.

A small stock of diesel oil is available.

Fresh provisions are not plentiful and supplies are irregular.

There is a plentiful supply of good drinking and boiler water.

There is a patent slip capable of lifting vessels up to 500 tons ; *see* Appendix II.

Repairs to machinery and boilers can be effected.

There are several tugs and about 15 lighters of capacity about 50 tons each.

There is a hospital with a number of beds for Europeans.

There is regular steamship communication with Europe.

A railway runs from Luanda for about 275 miles inland to Malange, and has several short branch lines to some of the more important places.

Luanda is connected with the general telegraph system.

There is a radio station, *see* page **44**.

Signal station.—There is a signal station at Fortaleza de São Miguel.

Charts 604, 627.

PONTA DAS PALMEIRINHAS TO PONTA DA RESTINGA.—Coast.—The low sandy spit, of which Ilha de Luanda is the north-eastern extremity, extends south-westward for about 24 miles to Ponta das Palmeirinhas (*Lat. 9° 04′ S., Long. 13° 00′ E.*), and encloses along its whole length an extensive but shallow lagoon, which communicates with the sea through Barra de Carimba, an opening about 2 miles wide situated about 15 miles north-eastward of Ponta das Palmeirinhas lighthouse.

The south-western part of this sandy spit is known as Ilha de Carenagé, and extends from Barra de Carimba to Ponta das Palmeirinhas, where it joins the mainland.

Ponta das Palmeirinhas, the south-western extremity of the spit, is low and sandy, and derives its name from the clumps of palm trees upon it.

Light.—A light is exhibited, at an elevation of 132 feet ($40^{m}2$) from a quadrangular iron tower on a white masonry base, 125 feet ($38^{m}1$) in height, with a group of dwellings close northward of it, situated on Ponta das Palmeirinhas, and about 1½ cables from the coast.

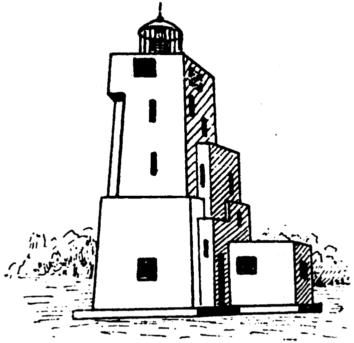
Local magnetic anomaly.—A local magnetic anomaly has been reported in the vicinity of Ponta das Palmeirinhas ; *see* page 38.

Baia de Cuanza.—Anchorages.—From Ponta das Palmeirinhas to Ponta Malli, at the mouth of Rio Cuanza, the distance is about 16 miles in a south-easterly direction, and the intervening land is low. Immediately within Ponta das Palmeirinhas there is a slight indentation, about 6 miles across, which is Baia de Cuanza ; it may be identified by a high dark wood near the centre of its sandy beach, while near its northern part are two hills in the form of paps which are not shown on the chart.

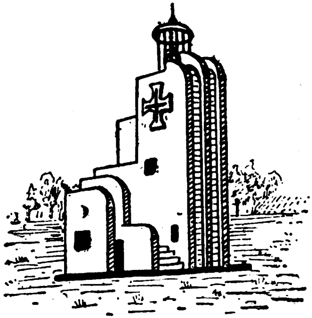
Anchorage may be obtained by vessels with local knowledge in Baia de Cuanza, in depths of from 6 to 9 fathoms ($11^{m}0$ to $16^{m}5$), ooze ; farther southward is another slight indentation which affords anchorage, in a depth of from 8 to 9 fathoms ($14^{m}6$ to $16^{m}5$). Anchorage may also be obtained by vessels with local knowledge off the mouth

Charts 1013, 2202a, 2203, 2127.

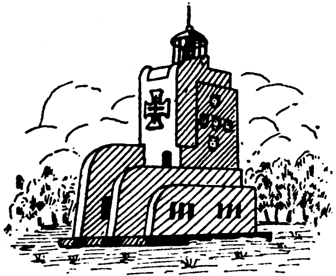
To face page 224.



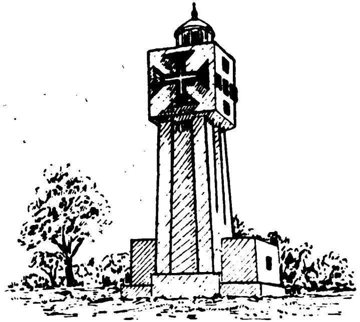
Cabeça de Cobra lighthouse.



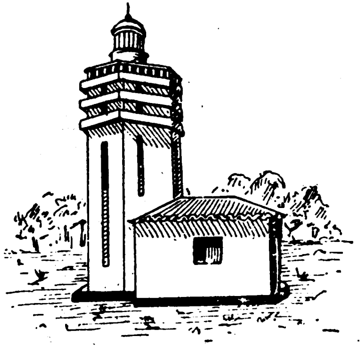
Ambrizete lighthouse.



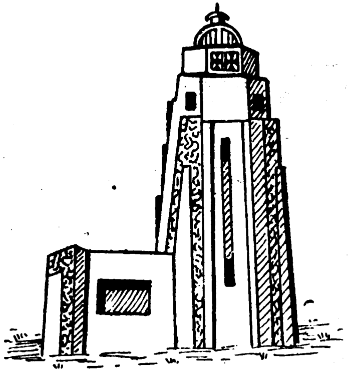
Ambriz lighthouse.



Morro das Lagostas lighthouse.

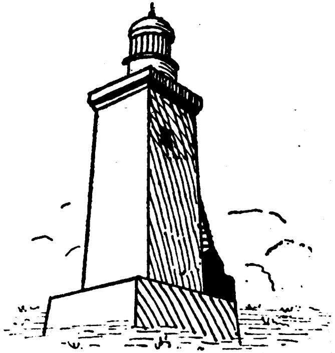


Cabo Ledo lighthouse.



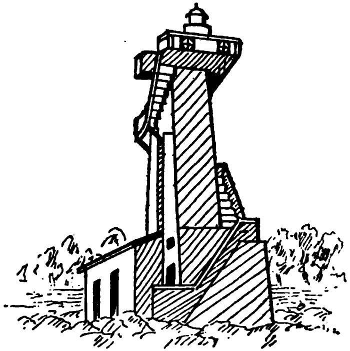
Cabo das Tres Pontas lighthouse.

(*Originals dated* 1949.)

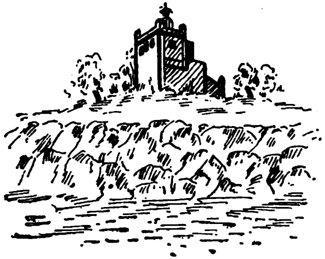


Morro Cambiri lighthouse.

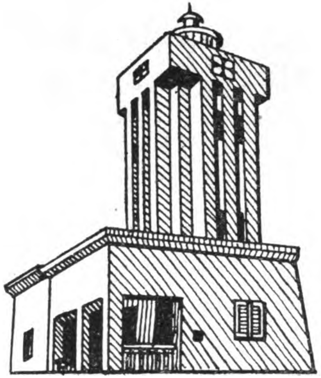
To face page 225.



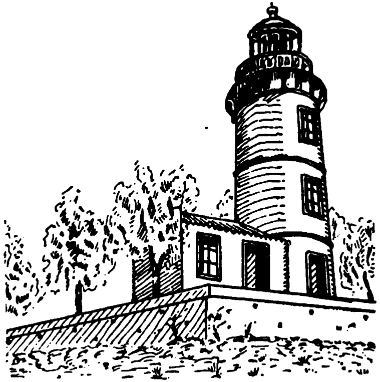
Morro de Benguela Velha lighthouse.



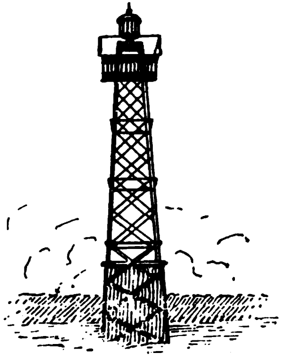
Novo Redondo fort and lighthouse.



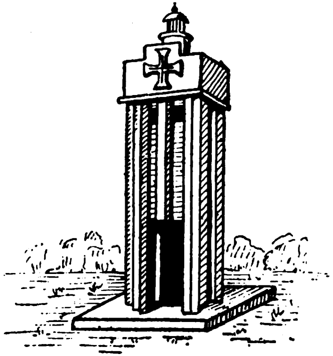
Ponta Vermelha lighthouse.



Lobito lighthouse.

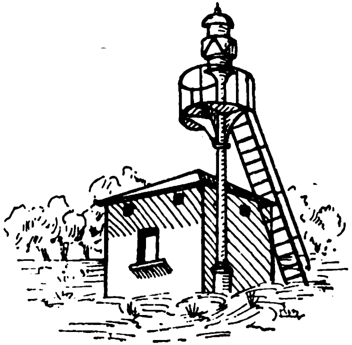


Restinga lighthouse.



Benguela front leading light.

(*Originals dated* 1949.)



Morro do Sombreiro lighthouse.

Charts 604, 627.

of Rio Cuanza, in from 12 to 15 fathoms ($21^{m}9$ to $27^{m}4$), at 9 miles offshore; as well as in 9 fathoms ($16^{m}5$), at 3 miles offshore; there is said to be good anchorage in 6 fathoms ($11^{m}0$), mud, at about 2 miles from the coast.

Rio Cuanza.—This river, though shallow, is of considerable importance, and its muddy waters discolour the sea for a distance of about 10 miles offshore. It is entered southward of Ponta Malli (*Lat. 9° 17′ S., Long. 13° 07′ E.*), which is densely wooded, and is about one mile wide at its mouth, but the bar is ever shifting and the sea frequently breaks right across it; this bar is extremely dangerous for boats, which should never attempt to cross it. Small vessels, drawing 8 or 9 feet ($2^{m}4$ or $2^{m}7$), with a smooth sea and local knowledge, can, however, cross the bar at high water, and ascend the river for many miles.

In 1886 during the wet season, Rio Cuanza was reported to be navigable from its mouth for a distance, following the course of the river, of about 120 miles, by vessels drawing about 4½ feet ($1^{m}4$); frequently in the dry season, the depths in the channels are, in some places, not more than 1½ feet ($0^{m}5$).

On the northern bank, and about 2 miles within the entrance to the river, is the mouth of a stream of considerable magnitude which flows from a lake; one mile further up the river, and on its southern bank, is the settlement of Cassanhe. Calumbo is situated on the northern bank of the river about 34 miles from its entrance; Muxima is on the opposite bank and about 41 miles further upstream. About 27 miles above Muxima, and one mile above the confluence of Rio Lucala, with Rio Cuanza, is Massangano; and about 16 miles further, and on the northern bank of the Cuanza, is the settlement of Dondo, which is situated at the limit of sea-borne navigation, as a little further up are some large cataracts and rapids.

Pilotage in Rio Cuanza is compulsory, *see* page 48.

Chart 627.

Coast.—Anchorage.—Light.—Cabo Ledo (*Lat. 9° 41′ S., Long. 13° 12′ E.*) is situated about 21 miles southward of the mouth of Rio Cuanza, and the intervening land is moderately high, with red cliffs facing the sea.

Ponta das Perdizes is situated about 14 miles northward of Cabo Ledo. Thence the coast trends south-south-eastward for about 6 miles to Ponta do Sangano. About 1¾ miles north-eastward of Ponta do Sangano is Enseada de Sangano on the shores of which bay is the small settlement of Sangano. A rock, awash, lies about three-quarters of a mile westward of Ponta de Sangano.

Baia do Suto is contained between Ponta do Sangano and Cabo Ledo. A shoal, known as Baixo do Suto, with depths of 19 feet ($5^{m}8$) over it, lies about 2¾ miles north-north-eastward of Cabo Ledo.

Immediately northward of Cabo Ledo is a sandy cove at the head of which is the mouth of a river; this river sometimes dries, though in the rainy season it appears to have a good flow; its mouth is choked with sand.

Anchorage for small vessels with local knowledge, sheltered from south-westerly winds, may be obtained in Baia do Suto, in a depth of about 4½ fathoms ($8^{m}2$), with Cabo Ledo bearing 246°, but at times a heavy swell sets round the cape, causing a vessel to roll, and raises

Chart 627.

a heavy surf on the beach. The depths shoal gradually towards the shore, and the cove is apparently free from dangers.

Cabo Ledo (*Lat. 9° 41′ S., Long. 13° 12′ E.*) is a high black, rugged promontory, covered with trees, and is easily identified from seaward as it is a salient point presenting the appearance of a truncated cone; when seen bearing about 186° it appears in the form of a recumbent lion, the trees and long grass forming the mane. *See* view facing page 223.

A light is exhibited, at an elevation of 397 feet ($121^{m}0$), from a white hexagonal stone tower with three galleries round the upper part, 39 feet ($12^{m}0$) in height, situated on the summit of Cabo Ledo. *See* view facing page 224. A dwelling stands close north-eastward of the lighthouse.

When making Cabo Ledo from north-westward, a mountain shows up conspicuously as a dark knob lying eastward of a gap in the land at the mouth of Rio Cuanza.

A reef projects a short distance from the northern end of Cabo Ledo, but there is a depth of 11 fathoms ($20^{m}1$) at a distance of about 8 cables from it.

Coast.—Cabo São Braz is situated about 19 miles south-south-eastward of Cabo Ledo, the intervening coast being bordered with remarkable white cliffs. The depths off this part of the coast are regular, depths of 10 fathoms ($18^{m}3$) being found between 2 and 5 miles offshore.

The mouth of Rio Minguez, a small stream, is situated about 6½ miles northward of the cape, and between these features is Enseada de São Braz.

Cabo São Braz, *see* views facing page 223, is steep-to, with depths of 4½ fathoms ($8^{m}2$) at about half a cable offshore; these depths continue round the bay to a sandy spit about a quarter of a mile long. Within this spit there is a small salt-water lake in which fish are plentiful, including sharks and saw-fish. At the foot of the hills southward of the bay is a large swamp; in 1928 there were no inhabitants.

Anchorage.—Anchorage can be obtained in Enseada de São Braz, by vessels with local knowledge, in depths of from 4 to 8 fathoms ($7^{m}3$ to $14^{m}6$).

Landing.—H.M.S. *Daffodil* visited Cabo São Braz on several occasions in 1927 and found that at times landing was possible inside the lagoon formed by the sandy spit, whilst at others the entrance was completely closed when landing became impracticable.

Coast.—Ponta do Longa, a point which offers no lee for anchoring, is situated about 14¾ miles south-eastward of Cabo São Braz, and is a bluff headland covered with brushwood. *See* view facing page 228. The intervening coast is backed by a high tableland, and there are depths of 10 fathoms ($18^{m}3$) between 2 and 3 miles offshore.

In this locality there are no human inhabitants, but lions, leopards, many kinds of antelope, and other wild animals exist in great numbers.

Cabo das Tres Pontas (*Lat. 10° 23′ S., Long. 13° 32′ E.*) is a projecting headland situated about 13½ miles south-south-eastward of Ponta do Longa, and between the two there is a bay at the head of which is the mouth of Rio Longa. Except at the entrance to the river, which is well-wooded, the shores of the bay are composed of high, white, irregular cliffs; in the bay there are depths of from 10 to

Charts 1013, 2202a, 2203, 2127.

Chart 627.

12 fathoms ($19^{m}3$ to $21^{m}9$), mostly mud, about 3 miles offshore. *See* view facing page 228.

From Cabo das Tres Pontas, the coast trends south-eastward for about 24 miles, and thence south-westward for about 5 miles to Morro de Benguela Velha. In the bay thus formed, known as Baia de Porto Amboim, there are no known dangers, and depths of 10 fathoms ($18^{m}3$) will be found at about 2 miles offshore.

Chart 1215, plan of Pôrto Amboim.

Morro de Benguela Velha is one of the most remarkable headlands on this part of the coast; it is very high, with perpendicular cliffs on its seaward side. Its summit is covered with tall cactus trees of peculiar appearance.

About 2¼ miles north-eastward of Morro de Benguela Velha is another headland, about 216 feet ($65^{m}9$) high, known as Morro Cambiri, and between these two headlands is a low-lying indentation into which flows a small stream. *See* view facing page 228.

Chart 627.

Lights.—A light is exhibited, at an elevation of 155 feet ($47^{m}2$) from a white square masonry tower, with two crosses on each face of the upper galleries, 46 feet ($14^{m}0$) in height, on Cabo das Tres Pontas (*Lat. 10° 23′ S., Long. 13° 32′ E.*); at the base of the tower are some dwellings; *see* view facing page 224.

Chart 1215, plan of Pôrto Amboim.

A light is exhibited, at an elevation of 280 feet ($85^{m}3$), from a white square tower, with two dwellings attached, 39 feet ($11^{m}9$) in height, situated on Morro de Benguela Velha; *see* view facing page 225.

A light is exhibited, at an elevation of 223 feet ($68^{m}0$), from a white masonry structure, 13 feet ($4^{m}0$) in height, on Morro Cambiri; *see* view facing page 224.

Pôrto Amboim.—Lights.—Jetty.—The settlement of Pôrto Amboim, which used to be known as Benguela Velha; is situated immediately eastward of Morro Cambiri, and is the seaport of the district of Amboim.

Coconuts, coffee and wool are exported.

There is a wooden jetty, about 300 feet ($91^{m}4$) long, for the use of lighters, but surf-boats must be employed when the surf is heavy and the jetty cannot be used.

Two lights are exhibited from iron structures on the jetty.

Anchorage.—Good anchorage, in tolerably smooth water, may be obtained in a depth of 10 fathoms ($18^{m}3$) with Morro Cambiri light-structure bearing 160° distant 3½ cables.

Port facilities.—A small quantity of fresh provisions is obtainable, with the exception of vegetables.

There is a hospital, situated near the jetty.

It is connected by rail with Gabela, about 35 miles east-south-eastward, and the railway runs a further 30 miles beyond.

An air field is situated about one mile north-eastward of Morro Cambiri.

There is occasional steamship communication with Europe.

Chart 627.

Coast.—From Morro de Benguela Velha the coast trends south-south-eastward for about 18¼ miles to Ponta da Balela, and thence about 9½ miles southward to Novo Redondo. The mouth of Rio

Chart 627.

Cuvo, the position of which may be identified by the usual clumps of dark mangroves, is situated about 8 miles south-south-eastward of Morro de Benguela Velha.

Landing is very difficult along this part of the coast.

The cliffy nature of the coast disappears in the vicinity of Rio Cuvo which flows through a low wooded plain; but southward of Rio Cuvo, the cliffs reappear, and continue almost without interruption for about 90 miles to Baia de Lobito. In these cliffs yellow patches, the results of landslips, will be seen. During clear weather, and particularly in December, January, and February, the summits of some high mountains, apparently running parallel with the coast, are to be seen inland.

Chart 1215, plan of Novo Redondo.

Novo Redondo.—Light.—Shoal.—Buoy.—The town of Novo Redondo is of some importance; it is easily recognised by a white fort and several white houses which show up well, and may be seen at a considerable distance. A wide road passes near the fort and descends to the coast; on this road, at the top of the hill, there is a house.

A light is exhibited, at an elevation of 103 feet ($31^{m}4$), from a black iron column surmounting two white huts, the whole 25 feet ($7^{m}6$) in height, situated in the northern corner of the fort (*Lat. 11° 12′ S., Long. 13° 50′ E.*). *See* view facing page 225.

Depths of less than 3 fathoms ($5^{m}5$) extend for about one mile offshore.

Two small piers are situated near the light-structure.

The mouth of Rio N'Gunza is situated close northward of Novo Redondo; for 5 or 6 months of the year the river is absorbed by the porous sandy ground through which it flows. The country in its vicinity is thickly populated.

There is a customs-house, a post office and a church.

Novo Redondo is connected with the general telegraph system; *see* page 44.

Supplies are available, but no water. There is a considerable trade in wax and rubber. The climate is considered to be very unhealthy during the rainy season.

There is regular, but not frequent, steamship communication with Europe.

Anchorage.—Vessels will find the best anchorage in depths of from 4 to 7 fathoms ($7^{m}3$ to $12^{m}8$), with the fort bearing 095°.

Landing is very difficult, except in surf-boats.

Chart 627.

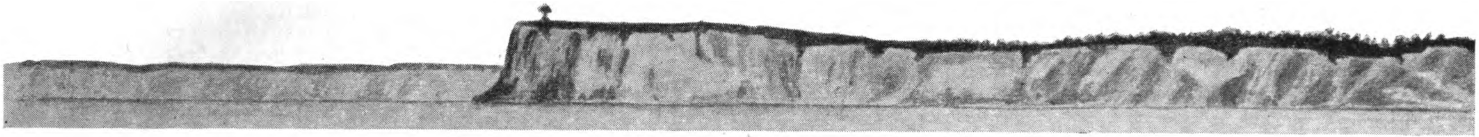
Coast.—From Novo Redondo the coast trends southward for about 7½ miles to Quicombo, situated at the head of the bay of the same name.

Quicombo.—Shoal.—This place at which there are several factories may be recognised from northward and westward by a remarkable zigzag road, which ascends from the back of the town and leads over the mountains behind it; this road is the best and most conspicuous mark from the offing.

The bay abounds in fish.

Ponta Quicombo, the southern entrance point of the bay, is a bluff red point. A rocky shoal, over which there is a depth of 2¼ fathoms

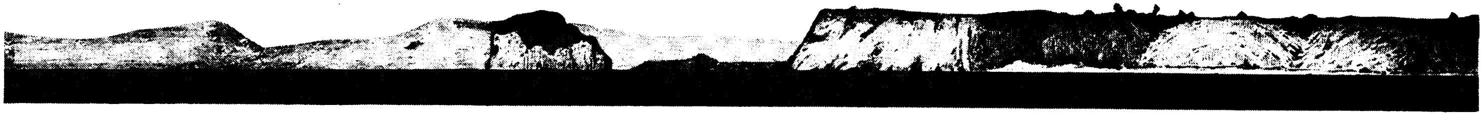
To face page 228.



Ponta Longa, bearing about 055°.

Coast in the vicinity of Ponta Longa.

(*Original dated* 1812.)



Çabo das Tres Pontas, bearing about 068°, *distant* 9 *miles.*

Coast in the vicinity of Cabo das Tres Pontas.

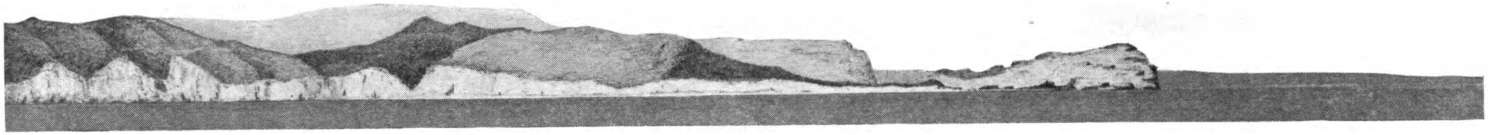
(*Original dated* 1871.)

Morro de Benguela Velha.

Coast in the vicinity of Morro de Benguela Velha.

(*Original dated* 1939.)

To face page 229.



Cabeça de Baleia.

Cabeça de Baleia from northward, distant 4 miles.
(*Original dated* 1871.)

Mouth of Rio Balombo,
bearing 068°, *distant* 3 *miles.*

Coast in the vicinity of Egito.
(*Original dated* 1870.)

Chart 627.

($4^{m}1$), on which the sea frequently breaks, lies nearly half a mile northwestward of Ponta Quicombo.

Rio Cubal enters the bay, to the eastward of the town.

Anchorage.—Good anchorage may be obtained off Quicombo, excepting during the time of the rollers; these frequently occur a couple of days after the full and change of the moon; when they set in they are sufficiently heavy to prevent communication with the shore; vessels intending to remain over these periods should not anchor within 1½ miles of the coast. *See* page 35.

A good position in which to anchor is in a depth of about 5 fathoms ($9^{m}1$), sand and mud, with the village bearing 163°, and Ponta Vermelha (Red point), situated about 2 miles southward of Ponta Quicombo, just open of an intermediate point, bearing 203°.

Approaching the anchorage from the southward, Ponta Quicombo should be given a berth of at least one mile, and the anchorage should be approached between the bearings 163° and 174°.

Coast.—Light—Ponta Vermelha (*Lat. 11° 21′ S., Long. 13° 48′ E.*) may be identified by the patches of red that mark its south-western face. The land southward of Ponta Quicombo is high. The village of Quissanga Pequeña is situated about 6 miles southward of Ponta Vermelha. Landing there can only be attempted in surf-boats; but about one mile northward of Cabeça da Baleia boats can land when the sea is smooth, but there is no village.

A light is exhibited, at an elevation of 437 feet ($133^{m}2$), from a white square masonry tower, 46 feet ($14^{m}0$) in height, with a cross on each face of the upper gallery, on Ponta Vermelha. A small white house stands close to the north-eastern side of the lighthouse. *See* view facing page 225.

Ponta do Barrote and Ponta do Dengue are situated, respectively, 4¾ and 9 miles southward of Ponta Vermelha.

Cabeça da Baleia is a dark coloured point, projecting about one mile from the coast, 13½ miles southward of Ponta Vermelha; it may be identified by a tableland near the beach about 2 miles northward of it. *See* view facing this page.

In working along the coast during the night, soundings should be obtained before approaching it too closely; in some places between Quicombo and Cabeça da Baleia depths of 7 fathoms ($12^{m}8$) have been found at a distance of 2 or 3 miles offshore.

Enseada da Baleia lies close north-eastward of Cabeça da Baleia.

From Cabeça da Baleia the coast trends southward about 23 miles, to the mouth of Rio Balombo, and is formed throughout of high, perpendicular chalky cliffs which may be seen from seaward in the rays of the afternoon sun at a great distance. *See* view facing this page.

Enseada dos Pombos is a slight indentation, the entrance to which is about 5 miles wide, situated immediately southward of Cabeça da Baleia; it has a fine sandy beach, and terminates southward in a rocky point. The sea breaks with considerable violence on the shore.

The mouth of Rio Tapado is situated about 12 miles southward of Cabeça da Baleia, and may be identified by some vegetation in the middle of a somewhat steep ravine, where also is a village.

Egito, at the mouth of Rio Balombo, may be known by a large white house standing on the right of a deep gorge, half way up the cliff, as well as by a remarkable cliff situated a little southward of the

Charts 1013, 2202a, 2203, 2127.

Chart 627.

entrance to the river, which is in the form of a wedge declining towards that entrance. There are some houses close to the beach at the bottom of the gorge. *See* view facing page 229.

There are several factories at Egito, whence fresh meat can be had, but no vegetables.

Enseada do Binge (*Lat. 12° 07′ S., Long. 13° 42′ E.*) is an indentation southward of Egito, about 4 miles wide between its entrance points. In the centre of the shore of this bay, about 12 miles southward of Egito, is a large village fronted by a sandy beach.

Landing can be effected in Enseada do Binge by the boats of coasting vessels, notwithstanding that the sea breaks on the beach with considerable force.

Hanha is a village at the mouth of Rio Cubal da Hanha, situated about 15 miles southward of Egito.

Anchorages.—Anchorage may be obtained, by vessels with local knowledge, off the village at the mouth of Rio Tapado, in a depth of about 8 fathoms ($14^{m}6$) at about one mile offshore, with the village bearing 095°.

Good anchorage, in depths of about 6½ fathoms ($11^{m}9$) may be obtained by vessels with local knowledge, off Egito, about 1½ miles offshore, with the house on the hill bearing 117°.

Anchorage may also be obtained by vessels with local knowledge, in a depth of 7 fathoms ($12^{m}8$), with the mouth of Rio Cubal da Hanha bearing 128°, distant 2 miles ; but, on account of the heavy surf, it is impossible to land in ships' boats, even under the most favourable conditions.

If necessary, vessels may bring up in depths of 30 fathoms ($54^{m}9$), at about 10 miles from the land, between Egito and Quicombo, but further northward the depths are greater at that distance offshore.

Chart 1215, plan of Pôrto do Lobito.

PÔRTO DO LOBITO.—General remarks.—This excellent and secure harbour is one of the best on the west coast of Africa southward of the equator.

The bay is sheltered on its western side by a narrow sandspit, about 2½ miles in length in a north-easterly direction, which terminates in Ponta da Restinga (Lobito point) (*Lat. 12° 19′ S., Long. 13° 35′ E.*). This sandspit was reported, in 1950, to be extending north-eastward. The beach on the north-western side of the bay is steep-to, but on the south-eastern side shoal water extends from 2 to 5 cables offshore.

The head of the bay is occupied by an extensive bank which dries, and, at low water, gives off a very offensive odour.

The spit is thickly covered with bungalows and other buildings ; the Governor's Palace, the Harbour Master's office, and the Post office are all situated near the middle of the spit.

The railway station and other buildings occupy the south-western end, and the native compound is situated about one mile further southward.

On the eastern side of the bay are several prominent stone and corrugated iron buildings, also a native village.

The navigable width at the entrance to the bay is about 4 cables, and within it increases to about 6½ cables.

Charts 1013, 2202a, 2203, 2127.

Chart 1215, plan of Pôrto do Lobito.

Wharves.—A concrete L-shaped wharf, has been constructed at the south-western corner of the bay. The section along the direction of the spit is 1,870 feet (570^{m}0) long, and that running north-westward and south-eastward is 952 feet (290^{m}2) long, giving a total berthing capacity for about six ocean-going vessels. There are depths of 34 feet (10^{m}4) alongside these wharves.

These wharves are connected to the railway system.

There is also a pier abreast the Harbour Master's office, about 1¾ miles south-westward of Ponta da Restinga.

Lights.—A light is exhibited, at an elevation of 348 feet (106^{m}1), from a white circular masonry tower with a dwelling attached and 49 feet (14^{m}9) in height situated on the cliffs on the eastern side of the entrance to Pôrto do Lobito, abreast Ponta da Restinga.

Restinga light is exhibited, at an elevation of 33 feet (10^{m}1), from a red iron framework tower with a hut at the base, 33 feet (10^{m}1) in height, situated on Ponta da Restinga (*Lat. 12° 19′ S., Long. 13° 35′ E.*); *see* views facing page 225.

Two lights, horizontally disposed, are exhibited from iron columns on the Harbour Master's pier, and form a good mark on which to anchor at night.

Buoyage.—A light-buoy, No. 1, painted red and exhibiting a *red flashing* light *every three seconds*, is moored about 3¾ cables eastward of Ponta da Restinga.

Light-buoy, No. 2, painted red and exhibiting a *red flashing* light *every three seconds*, is moored about 9 cables eastward of the head of the Harbour Master's pier.

Light-buoy, No. 3, painted red and exhibiting a *red flashing* light *every three seconds* is moored about 9 cables south-westward of the Harbour Master's pier.

Directions.—Anchorage.—The harbour is easily identified by the conspicuous lighthouse on the eastern side of the entrance, and Restinga light tower at the end of the spit is a good mark.

An embankment for a road, which appears as a conspicuous white patch near the head of the bay, is an excellent mark.

When approaching from south-westward, a niche in the hills as well as a prominent chimney near Catumbela (page 232) will be of assistance in identifying Pôrto do Lobito.

Ponta da Restinga (*Lat. 12° 19′ S., Long. 13° 35′ E.*) should be given a wide berth, and, after rounding it, course may be altered as requisite for the anchorage.

Anchorage may be obtained, in a depth of about 18 fathoms (32^{m}9), at a convenient distance southward of the Harbour Master's pier, vessels intending to proceed alongside either the pier or the wharf must wait until pratique has been granted.

Pilotage—For pilotage regulations, *see* page 48.

Port facilities.—Lobito is the ocean terminus of the Benguela railway, which, after passing Luao on the Angola-Belgian Congo frontier, connects with the Belgian Congo railway system and the Central African railway route.

In 1946, the population was about 17,000, of whom 2,000 were Europeans.

There is a hospital which has accommodation for Europeans.

Repairs can be executed.

Charts 1013, 2202a, 2203, 2127.

Chart 1215, plan of Pôrto do Lobito.

One 10-ton and several smaller cranes are available. Two tugs are stationed at the port, one of which is sea-going.

A moderate supply of coal is usually kept in stock in a coal hulk and on shore.

Large stocks of fuel oil are stored in tanks and in a hulk and a small quantity of diesel oil is available. The hulks are anchored on the south-eastern side of the harbour about 5 cables southward and south-eastward, respectively, of the Harbour Master's pier; the oil hulk, which shows a *red* light, occupying the north-eastern berth.

Fresh meat and potatoes are always available; there is an excellent supply of water, which can be taken alongside, or from a water lighter.

There is a radio station, and Lobito is connected to the general telegraph system; *see* page 44.

There is regular steamship communication with Europe, the Union of South Africa, and with other ports in Angola.

There is regular communication by air lines with Luanda and Pointe-Noire, and thence with Europe.

Shipping.—In 1948, 298 vessels of total gross tonnage of 1,867,909 tons entered the port.

Chart 627.

PONTA DA RESTINGA TO PONTA DO GIRAUL.—Coast.— Between Ponta da Restinga and Ponta do Sombreiro (*Lat. 12° 35′ S.; Long. 13° 18′ E.*), situated about 22 miles south-westward, the coast forms a bay, the shores of which are low and wooded. From the head of this bay, cliffs recede several miles inland and thence, taking a south-westerly trend, circumscribe the great plain at Benguela and rejoin the coast at Ponta do Sombreiro, on the western side of Baia de Benguela. The whole of this part of the coast lacks prominent landmarks, and the few houses on the coast, and on the hills behind, closely resemble each other.

The mouth of Rio Catumbela is situated about 10 miles south-westward of Ponta da Restinga, and its position is rendered conspicuous, when bearing about 094°, by a remarkable niche in the hills, about 4 miles inland, through which the river flows. Close westward of this niche is Catumbela, a town on the Benguela railway. This river is said to attain considerable dimensions inland and to be about 180 miles in length.

In the rainy season the river overflows its banks, and inundates a large tract of country, but in the dry season it is no more than a large stream. It is accessible to boats, and water could be easily procured from it, but it is said to contain injurious vegetable matter which frequently produces dysentery. The district in the vicinity of the river is thickly populated.

There are two old forts at Catumbela, situated on the summits of two hills, about 500 feet (152^{m}4) high, both on the southern bank of the river, one quarter of a mile eastward of the town and about 3½ miles inland. Each consists of a wall, about 20 feet (6^{m}1) high, of grey coloured stone, surrounding a long single-storied building with a red roof and yellow walls. They are visible from seaward when approaching the river, but would probably be mistaken from a distance for ordinary dwelling houses.

There is a large group of native huts built on the sides of the hills,

Chart 627.

about half a mile north-north-eastward of Catumbela, which would probably be more conspicuous than the forts, though being constructed of mud they do not stand out from the background.

There are several factories with tall chimneys on the northern bank of the river about half a mile westward of the town, but the buildings are hidden in vegetation.

Chart 1197, plan of Pôrto de Benguela.

Pôrto de Benguela.—Pôrto de Benguela, which is chiefly composed of a sandy beach, is situated eastward of Ponta do Sombreiro, about 14 miles south-westward of the mouth of Rio Catumbela.

The town of São Félipe de Benguela is situated in the north-eastern part of the bay, and is the capital of the province. It had a population, in 1946, of about 4,000.

The country inland of São Félipe de Benguela is high, attaining an elevation of about 1,519 feet ($463^{m}0$) at about 7 miles inland from the town; but the town itself is built on a marshy plain, which, during the rainy season, March and April, is almost inundated. These months are accounted the most sickly period, but at no time can the place be deemed otherwise than unhealthy. In an average year the temperature range is between about 50° F. and 90° F.

The western side of the bay is of moderate height, and very broken; it terminates in a promontory the northern extremity of which is Ponta do Sombreiro (*Lat. 12° 35′ S., Long. 13° 18′ E.*).

Morro do Sombreiro is a remarkable square-topped hill, 407 feet ($124^{m}0$) high, situated just within Ponta do Sombreiro, which obtains its name from its hat-like appearance, and may be identified from seaward at a distance of about 25 miles. *See* view facing page 236.

A depth of 8 feet ($2^{m}4$) lies about 2 cables north-north-eastward of Ponta do Sombreiro, and depths of less than 6 fathoms ($11^{m}0$) extend a further half cable, and are covered by a *red* sector of Benguela town front leading light, between the bearings of 053° and 090°.

On the eastern side of the bay, depths of 3 fathoms ($5^{m}5$), and less will be found about three-quarters of a mile from the shore. There are depths of one fathom ($1^{m}8$) just within the depths of 3 fathoms ($5^{m}5$) outside which the depths increase rapidly to 5 and 10 fathoms ($9^{m}1$ and $18^{m}3$).

Rio Cavaco enters the bay close northward of the town.

Lights.—Buoy.—A light is exhibited, at an elevation of 391 feet ($119^{m}2$) from a red iron column, on a masonry base, 23 feet ($7^{m}0$) in height, with a small white building nearby, situated on Morro do Sombreiro (*Lat. 12° 35′ S., Long. 13° 18′ E.*). *See* view facing page 225.

Leading lights are exhibited at Benguela town; the rear light, at an elevation of 53 feet ($16^{m}1$), from the northern tower of Benguela church; the front light, at an elevation of 37 feet ($11^{m}3$), from a small square tower, 23 feet ($7^{m}0$) in height, in front of the old fort, about 2½ cables west-north-westward of the rear light. *See* view facing page 225.

Two lights are exhibited from the head of the south-western pier.

A buoy is moored on the 6-fathom ($11^{m}0$) line, on the line of the leading lights.

Directions.—Anchorage.—A vessel approaching the anchorage from northward should keep at least 2 miles offshore in order to avoid the shoal that extends from the eastern side of the bay, and then steer into the *white* sector of Benguela town front leading light, between the

Charts 1013, 2202a, 2203, 2127.

Chart 1197, plan of Pôrto de Benguela.

bearings of 090° and 190°, to bring the leading lights into line, bearing 117°, and keep them so, which leads to the anchorage.

Approaching from southward Ponta de São José, which is low and sandy, and is situated about 8 miles west-south-westward of Ponta do Sombreiro, should be avoided.

Having passed Ponta de São José, steer into the *white* sector of Benguela town front leading light to bring the leading lights into line, bearing 117°, and keep them so, which leads to the anchorage.

Vessels approaching from westward or north-westward should do so in the *white* sector of Benguela front leading light, between the bearings of 090° and 190°, and steer to bring the leading lights into line, bearing 117°, and keep them so.

Anchorage may be obtained in a depth of about 7 fathoms (12^m8) seaward of the buoy, on the line of leading lights.

Port facilities.—An iron pier, on which there is a 3-ton and an 8-ton crane, extends from the shore at São Félipe de Benguela, and much facilitates landing; there is a depth of 9 feet (2^m7) at its head.

There is another landing pier about a quarter of a cable south-westward.

Fresh provisions are not obtainable, but the bay abounds in fish of a coarse description.

A small supply of water can be obtained at the head of the north-eastern pier.

São Félipe de Benguela is connected to the general telegraph system, and is on the Benguela railway.

There is an airfield south-westward of the town.

There is regular, but not frequent, steamship communication with Europe.

Chart 1215, plan of Baia Farta.

Coast. — Anchorages. — Light. — From Ponta do Sombreiro (*Lat. 12° 35′ S., Long. 13° 18′ E.*) the coast is cliffy for a distance of about 6 miles to Ponta das Vacas, and forms several snug coves where boats and small craft can shelter. Ponta de São José is a rounded sandy tongue situated about 1¾ miles north-westward of Ponta das Vacas, and the intervening coast recedes to a sandy beach at the head of Baia Farta.

Depths of 3 fathoms (5^m5), which are steep-to, lie between half a cable and 2½ cables off the beach.

There is a small settlement in Baia Farta which is principally centred round the mouth of a stream in the south-western corner of the bay.

Excellent anchorage may be obtained in Baia Farta, in a depth of about 14 fathoms (25^m6), at about 3½ cables from the shore; but this position is only about one cable from depths of 3 fathoms (5^m5).

Chart 627.

From Ponta de São José, the coast trends 22 miles south-westward to Ponta das Salinas, and is very steep-to, there being depths of 10 fathoms (18^m3) within one cable of the coast. This coast consists of white sandy beaches, and, as it projects far from the hills inland, is difficult to see until very close.

Tenda Grande bay is a slight indentation about 2 miles north-eastward of Ponta das Salinas. There are depths of 5 and 10 fathoms (9^m1 and 18^m3) about 5 and 7½ cables, respectively, from the head of the bight.

Charts 1013, 2202a, 2203, 2127.

Chart 627.

At about 4 cables westward of the head of the bight, are some native huts where landing can be effected, and 4 cables further westward is a zinc shed near the coast.

Ponta das Salinas is a low, rounded, sandy point extending 5 or 6 miles westward of the hills inland.

A light is exhibited at an elevation of 128 feet ($39^{m}0$) from a quadrangular iron tower on a white masonry base, 125 feet ($38^{m}1$) in height, situated nearly one cable within Ponta das Salinas (*Lat. 12° 50′ S., Long. 12° 57′ E.*). The lighthouse is prominent, and close eastward of it is a dwelling.

Temporary anchorage may be obtained in Tenda Grande bay in a depth of 5 fathoms ($9^{m}1$) at about 2½ cables from the coast, midway between the huts and the zinc shed.

Caution.—Current.—From Ponta do Sombreiro to Ponta do Pôrto (page 244), a distance of about 225 miles, great depths are found close to the coast, thus rendering anchorage almost impossible excepting in a few sheltered bays. In all cases, and especially in sailing vessels during light winds or calms, it is advisable to maintain a good offing, as the swell sets a vessel towards the coast.

On account of the light sandy nature of the low-lying foreshore, and the extreme haziness of the atmosphere which generally prevails, great caution is necessary to avoid over-estimating the distance from the land. This is particularly the case with respect to Ponta de São José and Ponta das Salinas, many vessels having run ashore in their vicinities on fine clear nights.

The current along the coast north-eastward of Ponta das Salinas sets offshore, but for 20 miles southward of that point, between it and Baia da Equimina, the current sets in towards the land and should be guarded against, especially at night.

Chart 1215, plan of Pôrto do Cúio.

Pôrto do Cúio. — Anchorages. — Pier. — Beacons. — Pôrto do Cúio is a small settlement on the shores of the bay of that name, about half a mile eastward of Ponta Bongue which is situated about 9 miles south-south-eastward of Ponta das Salinas (*Lat. 12° 50′ S., Long. 12° 57′ E.*).

Ponta Bongue is fringed with rocks, and a shoal with depths of less than 3 fathoms ($5^{m}5$) over it, extends about 3½ cables north-westward from it. A shelf with depths of less than 3 fathoms ($5^{m}5$) over it extends off the head of the bay for distances up to about 2½ cables.

A beacon, consisting of a white stone 5 to 6 feet ($1^{m}5$ to $1^{m}8$) high, and visible for a considerable distance, stands on Ponta Bongue. Similar beacons are to be found on Ponta Norte and Ponta Sul, situated one and 2 cables, respectively, eastward of Ponta Bongue.

There is a small pier at the head of the bay, near the sugar warehouse. An anchorage beacon is situated about 1¼ cables south-eastward of the sugar warehouse.

Anchorage in Baia do Cúio is bad, being exposed to the full force of south-westerly winds which cause a heavy swell.

The recommended anchorage for large vessels is about 6 cables northward of Ponta Bongue, in 6 fathoms ($11^{m}0$), with the north-eastern corner of the sugar warehouse in line with the anchorage beacon referred to above bearing 140½°.

Smaller vessels may anchor closer in, on the same line of bearing, in

Charts 1013, 2202a, 2203, 2127.

Chart 1215, plan of Pôrto do Cúio.

3¼ fathoms ($5^{m}9$) at a distance of about 3 cables from the head of the pier.

Pôrto do Cúio is connected by light railway to Dombe Grande, about 10 miles inland.

Chart 627.

Coast.—From Ponta Bongue to the northern point of Baia da Equimina, the distance in a south-westerly direction is about 15 miles. The intervening coast is steep-to, and the land is high and steep, but broken at intervals by ravines that run down to the sea and form small bays.

These bays are called Praia da Chituca, Praia do Noto, Praia do Nhime, and Praia da Lua, and are situated respectively, 2½, 5, 9 and 12 miles south-westward of Ponta Bongue.

Streams flow through the ravines, and the bays afford temporary shelter only, in fine weather, for vessels with local knowledge.

The country inland of this part of the coast is uninhabited except by game which is plentiful on the plains.

Baia da Equimina.—North point (*Lat. 13° 09′ S., Long. 12° 48′ E.*), the northern point of Baia da Equimina, consists of a conspicuous white cliff, about 270 feet ($82^{m}3$) high, apparently of chalky formation. This cliff extends north-eastward for a distance of about 2 miles to Praia da Lua.

On the shore about the centre of Baia da Equimina are the ruins of a sugar estate, which was abandoned in 1889; the partially ruined buildings are still standing and form a good mark by which to identify the bay, and the remains of a large white single-storied house on the foreshore in the centre of the bay is conspicuous.

The present population consists of woodcutters, herdsmen, and fishermen; in 1930 there was a Portuguese, in charge of the fishing station, living in the south-western corner of the bay.

Occasionally, when rains are falling inland, the river which flows into the bay is a rushing stream from 2 to 3 feet ($0^{m}6$ to $0^{m}9$) deep, but the surf is always heaviest opposite its mouth.

Landing in ships' boats can usually be effected on the beach at high tide, or in the morning before the sea breeze sets in; also at any state of the tide in the south-western corner of the beach.

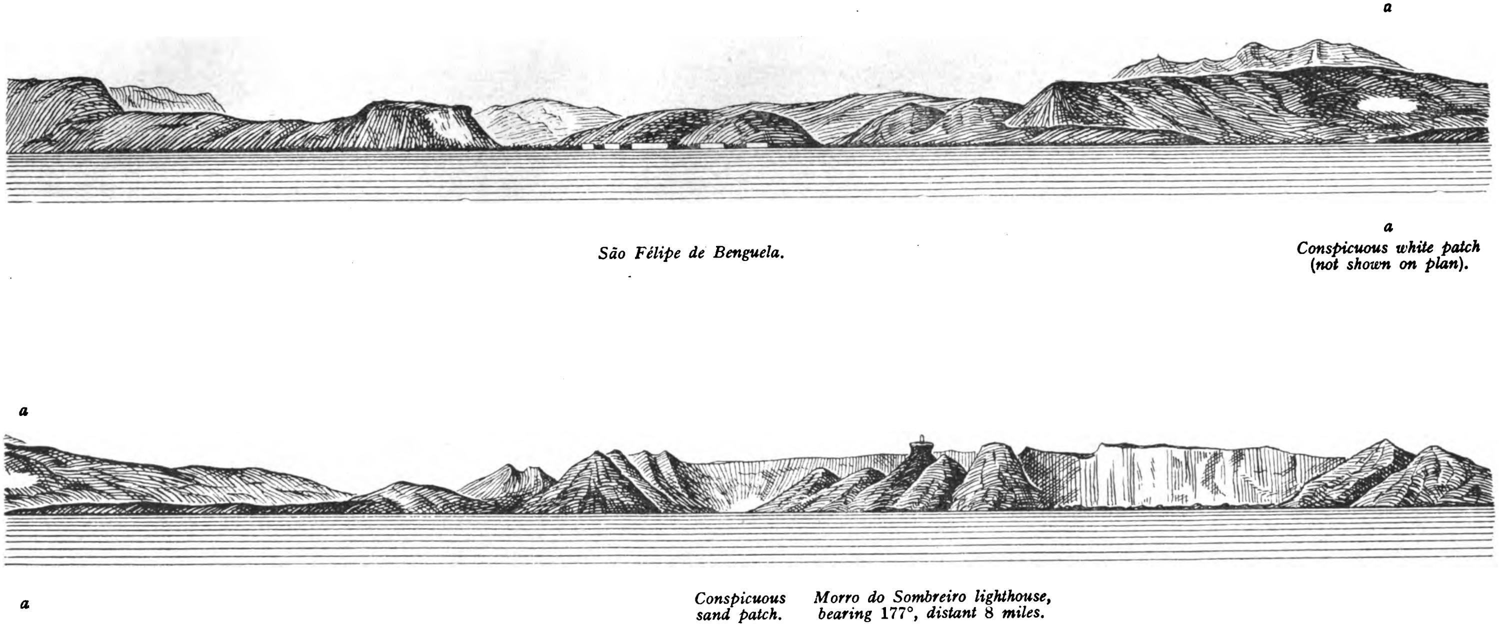
Anchorage.—The anchorage in the bay is very narrow, and the depths shoal quickly inside depths of 20 fathoms ($36^{m}6$), so that great care is necessary to avoid having too much way on the vessel when anchoring. A vessel may anchor in depths of from 13 to 15 fathoms ($23^{m}8$ to $27^{m}4$), at a distance of between one and 1½ miles north-north-eastward of South point, the southern entrance point of the bay, about 1½ cables from the shore. The anchorage is not, however, in any way sheltered from the sea breeze, and is not recommended.

Chart 1197, plan of Baia dos Elefantes.

Baia dos Elefantes.—Between South point and Ponta do Leste, the eastern entrance point of Baia dos Elefantes, a distance of about 1½ miles in a south-westerly direction, there are two small bights.

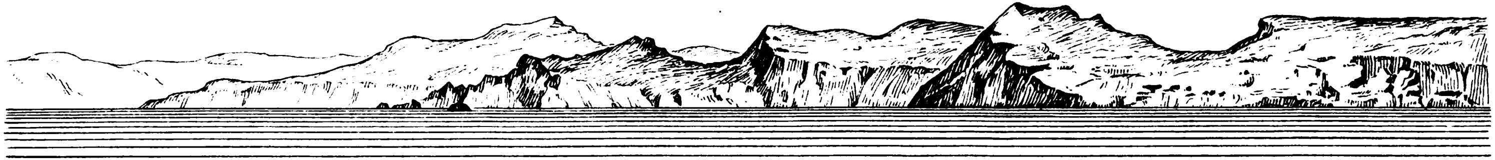
Baia dos Elefantes is entered between Ponta do Leste and Ponta dos Frades, about 2½ miles west-south-westward. *See* view facing page 237.

Roca dos Frades (*Lat. 13° 13′ S., Long. 12° 42′ E.*), are about 14 feet ($4^{m}3$) high, three in number, and steep-to; they lie within about



View, in two parts, of Baia de Benguela from north-westward.

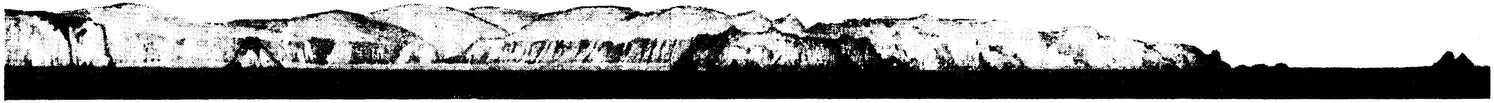
(*Original dated* 1889.)



Ponta dos Frades, bearing 084°,
distant 4 *miles.*

Coast southward of Baia dos Elefantes from westward.

(*Original dated* 1871.)



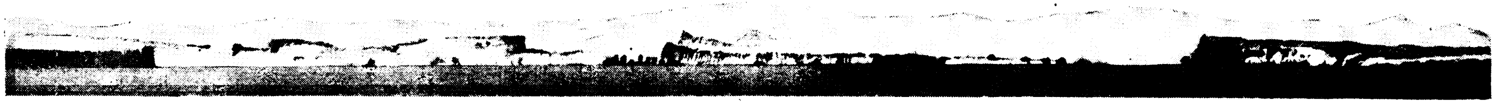
Ilha dos Passaros.

Cabo de Santa Maria, bearing about 180°,
distant 4 *miles.*

Ilhéus do Pina.

Baia de Santa Maria from northward.

(*Original dated* 1871.)



Ponta do Giraul.

Mouth of Rio Béro.

Ponta do Noronha,
bearing 112°.

Baia de Mossamedes from north-westward.

(*Original dated* 1871.)

Chart 1197, plan of Baia dos Elefantes.

2 cables north-westward of Ponta dos Frades. A rocky spit extends about one cable northward of the point.

Approaching Baia dos Elefantes from northward, the buildings of the abandoned settlement at Equimina are easily identified; and on nearer approach Roca dos Frades open out. From westward, these rocks are not seen until a vessel has passed them. The position of the bay may also be identified by a tableland, about 1,130 feet (344^{m}4) high, and situated near the south-western corner of the bay, which may be seen from afar and on which, near the summit on its eastern side, the names of many of H.M. ships have been outlined in stones and whitewashed; these show up in the form of a cairn when seen from seaward.

In the south-western corner of the bay are the abandoned buildings of a whaling station and a few fishermen's huts.

The climate is generally very healthy, as, indeed, it is on the whole coast southward of Ponta das Salinas. Landing is easy in the western part of the bay, and fish may be caught; game is plentiful in the neighbourhood. Caution is necessary when bathing as sharks are often seen in the bay.

Anchorage.—The bay is one of the best anchorages on this part of the coast, being perfectly secure and sheltered not only from the only winds that blow, namely those from southward to west-north-westward, but also from the rollers which occasionally set in along the whole coast. Though the depths in the bay are considerable, it shoals gradually towards the beach.

The best anchorage is in a depth of about 16 fathoms (29^{m}3), at about 7 cables north-north-eastward of the old whaling station; good anchorage may also be obtained about 3 cables from the same station.

Chart 627.

Current.—The current off Baia dos Elefantes generally sets north-north-westward; but occasionally it changes its direction and runs eastward, and has been known to attain a rate of 1½ knots; it does not appear ever to run southward as in other localities.

Coast.—The mountains backing the coast between Ponta dos Frades and Cabo de Santa Maria (*Lat. 13° 25′ S., Long. 12° 32′ E.*), situated about 16 miles south-westward, are of granite interspersed with alabaster, mica, and quartz, which reflect the rays of the sun to a considerable distance, like a vast mirror. St. Mary's Bonnet is a high, apparently isolated, hill, with a rounded base and flat top, situated about 2½ miles eastward of Cabo de Santa Maria; when coming from southward this hill is seen prominently above the cape.

Immediately southward of Roca dos Frades is an indentation about 3 miles across which extends as far as Ponta Choca. All round this bay steep cliffs rise from the shore, which is rocky and barren with a few isolated patches of sand. Landing there would be difficult.

Baia de Limagem is situated between Ponta Choca and Ponta Limagem, about 2½ miles south-south-westward, and is a sandy bay at the mouth of a ravine.

From Ponta Limagem the coast trends south-south-eastward for about 2 miles to Ponta das Mercês, enclosing a beach known as Praia Brava.

Praia da Binga is enclosed between Ponta das Mercês and Ponta Juliana about 2½ miles south-westward.

High cliffs rise from high-water mark, and are broken at intervals

Charts 1013, 2202a, 2203, 2127.

Chart 627.

by the mouths of ravines, in which are short sandy beaches on most of which latter landing could be effected.

Anchorage.—Baia de Limagem affords sheltered anchorage to small vessels with local knowledge and landing can be effected without difficulty at its southern end.

Chart 1215, plan of Baia de Santa Maria.

Baia das Tainhas.—Anchorage.—Baia das Tainhas which lies about 5 miles south-westward of Ponta Juliana is about three-quarters of a mile wide at its entrance, and its shores recede about the same distance southward; it is surrounded by steep cliffs, except for one ravine at its southern end, which gives access to the interior.

Good anchorage for large vessels with local knowledge, sheltered from the prevailing wind and swell, may be obtained in Baia das Tainhas in a depth of 17 fathoms ($31^{m}1$), about 3 cables from the sandy beach at its head. In the south-eastern corner of the bay, there is a little inner bay, about 1½ cables wide, in which small vessels could anchor, completely landlocked, in a depth of 4 fathoms ($7^{m}3$).

Baia Santa Maria.—This bay is the next indentation in the coast westward of Baia das Tainhas, and its entrance is about three-quarters of a mile across.

It is bounded on the western side by Cabo de Santa Maria and on the eastern side by Ponta Leste. Near its centre lies Ilha dos Passaros, which is 190 feet ($57^{m}9$) high. Between this island and the head of the bay, the depths in places do not exceed 2 fathoms ($3^{m}7$), but elsewhere the bay is deep. *See* view facing page 237.

Light.—A light is exhibited, at an elevation of 355 feet ($108^{m}2$), from a white square masonry tower, with a dwelling nearby, 39 feet ($11^{m}9$) in height, on Cabo de Santa Maria (*Lat. 13° 25′ S., Long. 12° 32′ E.*); on the upper part of the western face of the tower is a large cross. *See* view facing page 246.

Anchorage.—The anchorage, though sheltered, is only suitable for small vessels. The best anchorage is midway between Ilha dos Passaros and the western shore of the bay, in a depth of about 13 fathoms ($23^{m}8$), sand and decayed coral, with a prominent white painted mark on the cliff bearing 171°, and the northern extremity of Ilha dos Passaros bearing 057°. The only inhabitants of the bay are some native fishermen. Game is plentiful in the vicinity from February until April.

Chart 627.

Coast.—Anchorages.—Cabo de Santa Maria is of moderate elevation; on it there is a small pillar, only visible from a vessel when close inshore, which replaces the original, erected by Diego Cam in 1486. *See* view facing page 237.

Ilhéus do Pina (Pine islets) are a group of rocks the largest of which is a big black rock, 115 feet ($35^{m}0$) high, lying about one mile from the coast, and 3 miles south-westward of Cabo de Santa Maria; *see* view facing page 237. The passage between the islets and the coast has not been examined. Off the next point southward of Ilhéus do Pina, there is another islet of less elevation.

From abreast Ilhéus do Pina the coast, which is unusually steep-to, trends southward for about 26 miles to the head of Baia de Santa Marta, and thence westward for about 5 miles to Cabo de Santa Marta (*Lat. 13° 53′ S., Long. 12° 25′ E.*). This part of the coast is composed

Charts 1013, 2202a, 2203, 2127.

Chart 627.

of granite cliffs, which in most places rise steeply from the sea, but, in others, are intersected by valleys terminating in broad sandy beaches. The summits of these cliffs possess no characteristic forms, being mostly rounded off and covered with sparse vegetation. Southward of the first 12 miles, the valleys become more frequent, and the sandy beaches are broader.

Rio Catára (Dunque Amoxito) flows into the head of a small bay of the same name, situated about 6 miles southward of Ilhéus do Pina, and native fishermen frequent it for watering. Landing can be effected in surf boats at the southern end of this bay.

Anchorage can be obtained by vessels with local knowledge off Rio Catára in a depth of 10 fathoms ($18^{m}3$) at a distance of about 2¼ cables from some ruined stone huts on the beach, but the change from considerable depths to those suitable for anchorage is very sudden.

Rio Cangala enters the sea about 8 miles further southward.

Chart 1215, plan of Baia de Santa Marta.

Enseada do Bonfim, which lies about 7½ miles southward of Rio Cangala, affords anchorage in depths of about 16 fathoms ($29^{m}3$) about 1½ cables offshore.

Baia de Santa Marta.—Anchorages.—Baia de Santa Marta is a large indentation in the coast contained between Cabo de Santa Marta (*Lat. 13° 53′ S., Long. 12° 25′ E.*) and Ponta da Bissonga, situated about 6 miles east-north-eastward.

Between Cabo de Santa Marta and Ponta das Ventas, 4¼ miles east-north-eastward, the coast contains two small bays known as Enseada do Calonga and Enseada do Capato.

Between Ponta das Ventas and Ponta da Bissonga there is a deep indentation known as Baia das Luciras containing a number of smaller bays.

The bay lying southward of Ponta das Ventas is very deep and from this fact derives its name of Doca Sem Fundo (Bottomless pit).

Ponta do César, which projects northward from the southern shore of the bay, is situated about one mile south-eastward of Ponta das Ventas and is the western point of Praia do César, upon the shores of which is a small settlement.

Anchorage can be obtained in Praia do César in about 7½ fathoms ($13^{m}7$), in the middle of the bay.

Praia da Lucira, on the shore of which is the settlement of Lucira Grande (*Lat. 13° 52′ S., Long. 12° 31′ E.*) lies about one mile north-eastward of Ponta do César.

Anchorage can be obtained in about 10 fathoms ($18^{m}3$) about 1¼ cables offshore, but the depths shoal rapidly and great caution must be observed when anchoring.

Ponta da Papagaio, which is situated about 1¾ miles east-north-eastward of Ponta das Ventas, is the southern point of Enseada da Bissonga, at the northern end of which about half a mile eastward of Ponta da Bissonga is a small settlement.

Coast.—Cabo de Santa Marta is of moderate elevation and forms a salient feature in this part of the coast. The high cliffy nature of the coast terminates at the cape, and southward of it there is a succession of small sandy beaches, separated by low cliffy points.

Lights.—A light is exhibited, at an elevation of 162 feet ($49^{m}4$), from a white hexagonal masonry tower with a dwelling nearby,

Charts 1013, 2202a, 2203, 2127.

Chart 1215, plan of Baia de Santa Marta.

46 feet (14m0) in height, on Cabo de Santa Marta. *See* view facing page 246.

Chart 627.

Coast.—Anchorage.—The mouth of Rio Carunjamba is situated about 4½ miles southward of Cabo de Santa Marta, and about one mile north-eastward of Ponta do Carunjamba, at the head of a slight indentation.

Ponta do Inamangande is situated about 6½ miles south-south-westward of Ponta do Carunjamba and forms the southern point of Baia das Matilhas. At the head of this bay, near the mouth of Rio Inamangande, there are several green trees and bushes and a few houses.

Baia das Salinas is a bay which lies immediately eastward of Ponta das Salinas (*Lat. 14° 11′ S., Long. 12° 20′ E.*), which is situated about 7½ miles southward of Ponta Inamangande.

Depths of 3 fathoms (5m5) or less, will be found within one-half to one-quarter of a mile from the head of the bay.

Anchorage may be obtained in Baia das Salinas, well sheltered from the prevailing winds and swell, by vessels with local knowledge in depths of from 8 to 10 fathoms (14m6 to 18m3).

There is a small settlement at Salinas on the southern shore of the bay.

Ponta Grossa, which can be identified by the yellow and red composition of the cliffs, is situated about 2 miles southward of Ponta das Salinas.

Light.—A light is exhibited, at an elevation of 165 feet (50m3) from a white square masonry tower, 46 feet (14m0) in height, on Ponta Grossa; *see* view facing page 246.

Coast.—Anchorage.—From Ponta Grossa (*Lat. 14° 13′ S., Long. 12° 20′ E.*) the coast trends south-south-eastward for about 5 miles to Ponta dos Mocuandos, close north-eastward of which lies Baia Velho, into which Rio de São Nicolau discharges. A reef, over which the depth is only 10 feet (3m0), extends about 1½ miles off the southern entrance point of the river.

Temporary anchorage may be obtained in Baia Velho by vessels with local knowledge in depths of from 5 to 6 fathoms (9m1 to 11m0), but it is exposed and the bay affords no shelter.

Monte Velho, 750 feet (228m6) high, is situated on the southern side of Baia Velho about 6 miles from the mouth of Rio São Nicolau, and owing to its singular truncated form is an admirable mark for making the bay from southward; it is of a darker colour than the coast in its vicinity, and when seen on certain bearings appears as if detached.

South-eastward of Monte Velho, and farther inland than that hill is a range of table hills extending northward and southward for a distance of about 12 miles.

About 6 miles southward of Ponta dos Mocuandos, and at a distance of about 9 cables offshore, are two rocks known as Lageas, the higher of which is about 9 feet (2m7) high. The 10-fathom (18m3) line extends a further 5 cables westward.

Enseada do Chapeau Armado is a small indentation in the coast about 3 miles southward of Lageas rocks (*Lat. 14° 24′ S., Long. 12° 21′ E.*).

From Enseada do Chapeau Armado the coast trends south-south-

Chart 627.

westward for about 24 miles without distinctive features, other than a number of beaches, to Ponta de Santa Gertrudes.

The 100-fathom ($182^{m}9$) line between the latitudes of these two places extends to distances varying from 6 miles to one mile offshore.

Baia do Baba.—Beacon.—Anchorage.—Baia do Baba is a small indentation situated immediately eastward of Ponta de Santa Gertrudes. A beacon is reported to exist on Ponta de Santa Gertrudes.

There is a small settlement on the southern shore of the bay.

Anchorage may be obtained in about 15 fathoms ($27^{m}4$), about 1½ cables offshore, but it is not sheltered from the prevailing winds.

Coast.—Anchorage.—Baia do Cucuio lies about 3½ miles southward of Ponta de Santa Gertrudes. Vertical cliffs separate this bay from Baia das Pipas which is situated close eastward of Ponta do Gigante, about 7½ miles south-south-westward of Ponta de Santa Gertrudes.

Good anchorage may be obtained, by vessels with local knowledge, in Baia das Pipas in depths of from 10 to 13 fathoms ($18^{m}3$ to $23^{m}8$).

Enseada do Cherungo, which is separated from Ponta Gigante, 4 miles northward, by vertical cliffs has depths of 7 fathoms ($12^{m}8$) about half a mile offshore.

Ponta de Euspa, situated about 9 miles south-south-westward of Ponta Gigante is the southern point of Portada do Giraul, situated at the mouth of Rio Giraul.

Ponta de Euspa is low, and dark in colour, with a few bushes on it, but without any remarkable feature.

Chart 1197, plan of Baia de Mossamedes.

Ponta do Giraul (*Lat. 15° 08′ S., Long. 12° 07′ E.*), situated about 4 miles southward of the mouth of Rio Giraul, is a rounded point, rocky and steep-to, and of moderate elevation ; *see* view facing page 237.

Light.—Signal station.—A light is exhibited, at an elevation of 85 feet ($25^{m}9$), from a white square masonry tower with a cross on its western face, 79 feet ($24^{m}1$) in height situated on Ponta do Giraul ; *see* view facing page 246. Close to the light-structure there are two dwellings and a signal station with a flagstaff.

Chart 627.

BAIA DE MOSSAMEDES.—General remarks.—Ponta da Annunciação is situated about 7 miles south-south-westward of Ponta do Giraul, and the intervening coast recedes to form a bay, at the head of which is a large inner bay, in the south-eastern corner of which latter is the town of Mossamedes.

Chart 1197, plan of Baia de Mossamedes.

Baia de Mossamedes is backed by some ranges of high hills which appear very white when seen from the offing with the sun shining upon them. When their outline is once known, they become excellent marks by which to recognise the locality. *See* view facing page 237.

From Ponta do Giraul (*Lat. 15° 08′ S., Long. 12° 07′ E.*) the northern entrance point of the inner bay, cliffs, from 50 to 100 feet ($15^{m}2$ to $30^{m}5$) high curve eastward and north-eastward, for about 1¾ miles to the head of Saco do Giraul, where there is a ruined pier from the root of which a railway runs to Mossamedes.

At the head of this cove there are some warehouses, a fishery establishment, and a lime kiln with a chimney.

Charts 1013, 2202a, 2203, 2127.

Chart 1197, plan of Baia de Mossamedes.

From the head of Saco do Giraul, a sandy beach, forming the head of the inner bay, curves southward, for about 4½ miles, to a bluff rocky promontory in the southern part of the inner bay, on which stands Fortaleza de São Fernando. Near the middle of this beach, is the mouth of Rio Béro, which, after flowing for some 30 miles, becomes almost absorbed in the ground before reaching the coast. Near the mouth of the river are some gardens and a chalybeate spring.

Close westward of the bluff promontory, described above, is the Governor's palace.

The shore westward of the fort forms a sandy bay, which is bounded on its western side by Ponta do Noronha, and in the south-western corner of which is a fishing station.

Ponta do Noronha is faced with a perpendicular sandstone cliff, 125 feet (38^{m}1) high, and on its summit is a light-structure, *see* view facing page 237.

Ponta Negra is situated about one mile south-westward of Ponta do Noronha, and is also cliffy, but only 40 feet (12^{m}2) high. The shore of the bay between these two points is formed of yellow sandstone cliffs.

From Ponta Negra, the cliffy shore trends south-south-westward, for about three-quarters of a mile, to Praia Amelia, where there is a whaling station, situated at the head of a bay, of which Shoal point is the western entrance point.

Shoal point (*Lat. 15° 12′ S., Long. 12° 06′ E.*) is situated about one mile west-south-westward of Ponta Negra, and is low and sandy, with several sandhills in its vicinity.

Chart 627.

Ponta da Annunciação is situated about 3½ miles south-westward of Shoal point, and is also low and sandy, and therefore difficult to make out. A spit, on which the sea breaks heavily at times, extends 3 cables from Ponta da Annunciação.

Chart 1197, plan of Baia de Mossamedes.

Lights.—A light is exhibited, at an elevation of 128 feet (39^{m}0) from a white masonry tower with a black horizontal band, situated on Ponta do Noronha. *See* view facing page 246.

A light is exhibited, at an elevation of 96 feet (29^{m}3), from a white square masonry structure 13 feet (4^{m}0) in height, at Fortaleza de São Fernando.

A light is exhibited from an iron column on the head of the pier at Mossamedes.

Shoals.—Baixo Amelia extends for about 13 cables in a northerly direction from Shoal point, and its extremity is steep-to; it consists of sand, stones and rock, with depths over it of less than 5 fathoms (9^{m}1), but there is a 2-foot (0^{m}6) patch about 4 cables within its northern extremity. This shoal is very dangerous, and the sea breaks heavily over it at intervals. The shoal is covered by the *green* sector of Ponta do Noronha light between the bearings 055° and 115°.

Fortaleza de São Fernando, bearing about 116° and open northward of Ponta do Noronha, leads about 3 cables northward of Baixo Amelia. Fortaleza de São Fernando light, bearing more than 119° and showing *white*, also leads northward of the bank.

The depths in the centre of Baia de Mossamedes are very great, but in Saco do Giraul they are moderate; the western shore of this cove is

Charts 1013, 2202a, 2203, 2127.

Chart 1197, plan of Baia de Mossamedes.

steep-to, but a bank on which the depths are less than 5 fathoms ($9^{m}1$) extends about one cable from its eastern shore.

The depths in the south-eastern part of Baia de Mossamedes are moderate, but a shoal with depths of less than 3 fathoms ($5^{m}5$) extends about 6 cables from the shore at the head of the bay southward of the mouth of Rio Béro.

This shoal is covered by a *red* sector of Fortaleza de São Fernando light, between the bearings of 177° and 197°.

Prominent objects.—The following objects at Mossamedes are prominent from seaward :—

The radio mast, about 180 feet ($54^{m}9$) high, which is situated about 6 cables north-eastward of the light on Fortaleza de São Fernando.

Fortaleza de São Fernando (*Lat. 15° 12′ S., Long. 12° 09′ E.*).

The Governor's Palace, which is a large two-storied building with a small central tower, situated about 1½ cables south-westward of the fort.

The church of Santa Adria, which has two towers, and is situated close south-westward of the Governor's residence.

The military hospital, situated about 1½ cables south-westward of the church.

The tall chimney at Praia Amelia whaling station, which is useful when making the bay from the northward.

Anchorage.—Caution.—The anchorage in Baia de Mossamedes is good, and is sheltered from all except northerly to north-westerly winds ; it is easy of approach.

Good anchorage, out of the swell, may be obtained in the south-eastern corner of the bay, about midway between Ponta do Noronha and Fortaleza de São Fernando, with the latter bearing 126°.

Vessels can also anchor further eastward, off the pier, but must not anchor eastward of a line drawn 310° from the radio mast on account of submarine cables, the positions of which are indicated on the chart.

A heavy sea usually breaks on Ponta do Giraul.

A fishing fleet is often encountered off Baixo Amelia at night, each boat of which is well lighted.

Climatic table.—*See* page 76.

Pilotage.—For pilotage regulations, *see* page 48.

Mossamedes.—This town, which, in 1943, had a population of about 4,500, is the principal fishing port of Angola.

There is a hospital with accommodation for Europeans and natives.

Cotton, sugar, and coffee are cultivated, and a considerable quantity of fish is cured for export.

The climate is usually healthy, except in the vicinity of the marshes near the Rio Béro, and is bracing from about June to September. In January, February and March, when the rivers are sometimes in flood, sickness is more prevalent.

Port facilities.—An iron pier extends from the shore near the centre of the town, but dries except for a small portion near its head. The landing ladder for boats, with a depth of about 10 feet ($3^{m}0$) alongside, is quite close to the drying portion of the pier, and as there is generally a very heavy surf, boats must be most carefully handled to avoid capsizing. The custom-house is at the root of the pier.

Charts 627, 1013, 2202a, 2203, 2127.

Chart 1197, plan of Baia de Mossamedes.

All cargo is worked with lighters ; there is a 5-ton steam crane on the pier, as well as a hand crane.

There is occasional steamship communication with Europe, and with other ports in Angola.

There is a radio station, *see* page 44, and Mossamedes is connected to the general telegraph system.

There is a railway to Sá da Bandeiro, about 80 miles east-north-eastward.

Fresh provisions and water, which latter is supplied by lighter, are obtainable. Fish can be taken in any quantity in the seine, the best time being in the early morning ; large fish can be caught in great numbers off Ponta do Noronha (*Lat. 15° 11′ S., Long. 12° 07′ E.*), with hook and line ; foreigners must obtain leave from the Governor to fish.

Chart 627.

PONTA DA ANNUNCIAÇÃO TO RIO CUNENE.—Coast.—Near Ponta da Annunciação, *see* page 242, the coast again becomes cliffy, and is backed by hills. Ponta dos Meros is situated about 3½ miles southward of Ponta da Annunciação, with Ponta do Diabo about 7 miles further southward.

About 9 miles southward of Ponta do Diabo, Rio dos Flamingos enters the sea from a gorge close southward of Morro Columbi, which is 384 feet (117$^{\text{m}}$0) high. Its mouth is completely blocked by sand during the dry season.

Cabo Negro is situated about 9½ miles south-south-westward of the mouth of Rio dos Flamingos.

Cabo Negro is a remarkable headland, formed by a precipitous mass, upwards of 200 feet (61$^{\text{m}}$9) high, rising at the extremity of a low point, and resembling an island. It has a round, rugged, black face, from which it obtains its name, and is encrusted by different coloured earths and sands, abounding in fossilised shells. On the summit of the cape stands a pillar, or the remains of a marble cross, erected by Diego Cam, in 1486. *See* views facing pages 244 and 245.

The 10-fathom (18$^{\text{m}}$3) line between Cabo Negro and Ponta do Pinda, situated about 5 miles south-south-westward, extends to a distance of between 2 and 13 cables offshore.

The mouth of Rio Coroca (*Lat. 15° 43′ S., Long. 11° 55′ E.*), is situated about 3 miles southward of Cabo Negro.

The rocks on this portion of the coast appear to be of two or three different kinds, but principally sandstone in horizontal strata, in which fossils are embedded ; others being of primitive or volcanic formation are of harder and less regular structure.

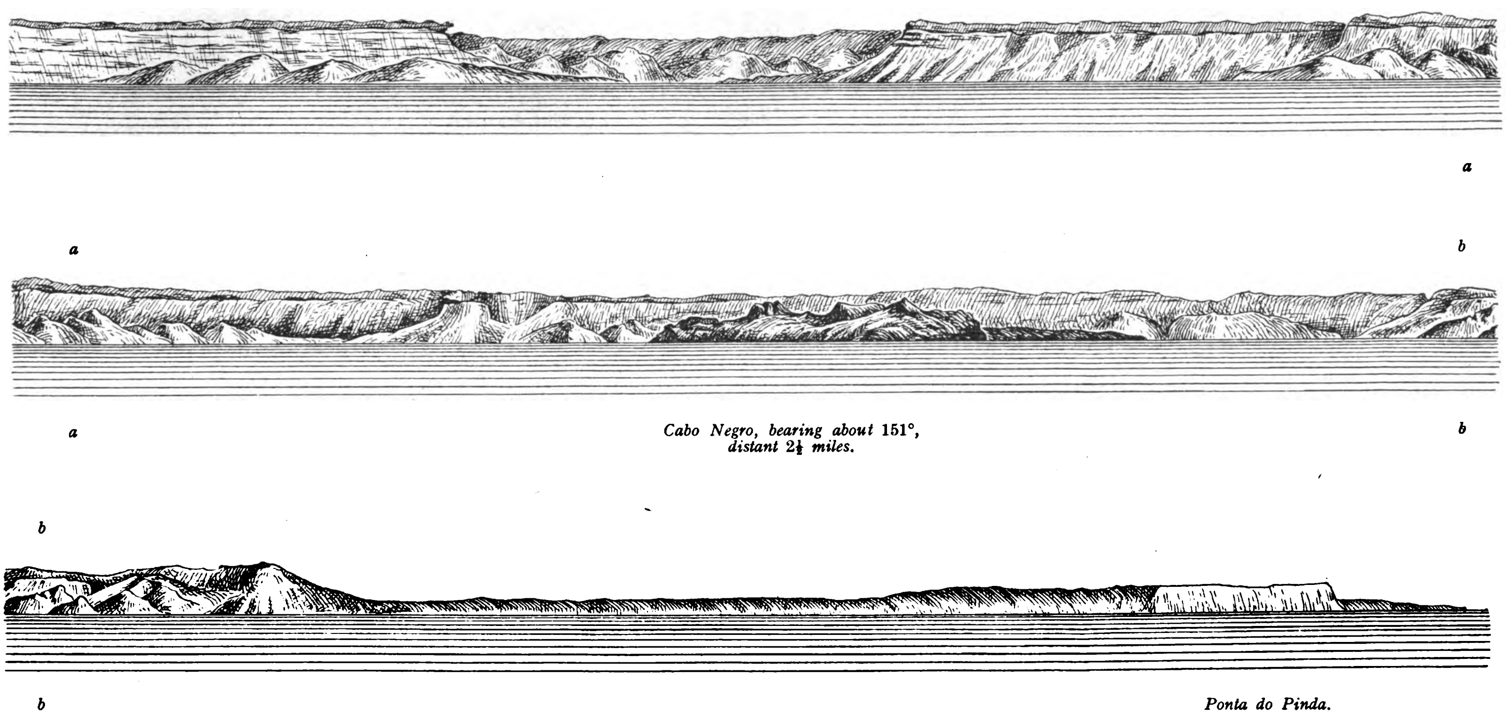
Chart 1215, plan of Pôrto Alexandre.

This harbour is entered between Ponta do Pinda and Ponta do Pôrto, situated about 3 miles south-westward of it.

Ponta do Pinda is 122 feet (37$^{\text{m}}$2) high, and projecting from the interior like an immense wall forms a good landmark, *see* views facing pages 244 and 245.

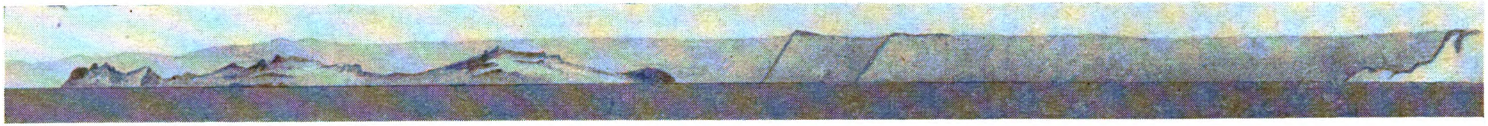
Ponta do Pôrto is the eastern extremity of a low, steep and narrow sandy peninsula which forms the western and northern sides of the harbour. In September 1926, this spit was breached by the sea for a distance of about 2 cables.

Charts 627, 1013, 2202a, 2203, 2127.



Cabo Negro, bearing about 151°,
distant 2½ *miles.*

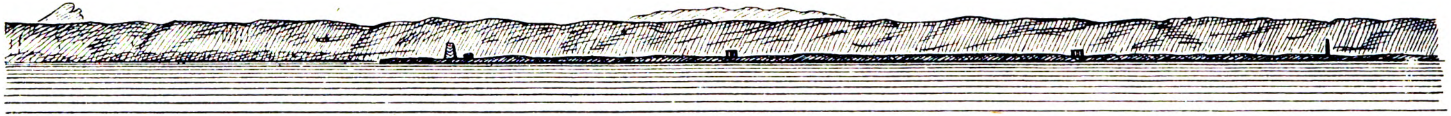
View, in three parts, of the coast in the vicinity of Cabo Negro.
(*Original dated* 1887.)



Cabo Negro, bearing about 064°, distant 6 miles.
Ponta do Pinda.

Coast southward of Cabo Negro.

(*Original dated* 1871.)



Ponta da Marca lighthouse. (Appearance now altered.)
Ruined hut.
Refinery.
Chimney.

Baia dos Tigres from westward.

(*Original dated* 1925.)

Chart 1215, plan of Pôrto Alexandre.

Ponta Brava is situated on the spit about 13 cables westward of Ponta do Pôrto at a position where the spit turns west-south-westward.

Light.—A light is exhibited at an elevation of 30 feet ($9^{m}1$) from a red tripod beacon with a stone hut at the base 26 feet ($7^{m}9$) in height, erected near the extremity of Ponta do Pôrto (*Lat. 15° 47′ S., Long. 11° 51′ E.*).

Dangers.—Banco do Pinda, over which there are depths of less than 6 fathoms ($11^{m}0$), and with a least depth of 26 feet ($7^{m}9$), extends about 6½ cables north-westward from a position about 1½ miles north-north-eastward of Ponta do Pôrto light-structure. Depths of up to 11 fathoms ($20^{m}1$) extend a further one to 2½ cables all round the shoal.

The shoaler part of Banco do Pinda is covered by the *green* sector of Ponta do Pôrto light, between the bearings of 185° and 215°.

Baixo da Ponta Brava, over which there are depths of less than 11 fathoms ($20^{m}1$), extends up to about 13 cables north-westward and 4 cables northward of Ponta Brava.

A shoal, with depths of less than 6 fathoms ($11^{m}0$) over it, the inner part of which dries, extends southward of the whole length of the spit for distances varying between 2 and 5½ cables.

Settlement.—Porto Alexandre, which had a population, in 1943, of about 2,500, is a centre of the fishing industry ; it has a Customs House, and there is a Captain of the Port.

There is a small jetty situated on the southern side of the harbour about one mile southward of Ponta do Pôrto.

No supplies are available, but fish can be caught with the seine, and shell fish can be found in abundance in the sands westward of the bay.

Porto Alexandre is connected to the general telegraph system.

Directions.—Anchorage.—When making Porto Alexandre from northward it may easily be recognised by Ponta do Pinda, but the approach from southward or westward is attended with some uncertainty, as the sandy peninsula does not show up as distinct from the mainland and mists are of frequent occurrence. Care must be taken to avoid Banco Grande, *see* below.

Both the port, and the village on the sand dunes on the southern side can, however, be seen over the peninsula from the masthead.

On nearing the entrance, Ponto do Pôrto (*Lat. 15° 47′ S., Long. 11° 51′ E.*) should not be brought to bear more than 182°, until within one mile of it.

When Ponta do Pinda bears less than 080°, Banco do Pinda will have been passed, and Ponta do Pôrto can be rounded at a convenient distance by bearings of the light, or pier on the southern side of the bay. Anchorage may then be selected as convenient.

Chart 627.

Coast. — Light. — Fog signal. — Caution. — About 2½ miles westward of Ponta Brava is an unnamed point from which Banco Grande, with depths of less than 10 fathoms ($18^{m}3$) over it, extends northward for about 3 miles.

From this un-named point the coast trends south-south-westward for about 7 miles to Ponta Albina.

A light is exhibited, at an elevation of 126 feet ($38^{m}4$), from a white quadrangular iron tower on a masonry base, 125 feet ($38^{m}1$) in height,

Charts 1013, 2202a, 2203, 2127.

Chart 627.

about one mile north-eastward of Ponta Albina. A fog signal is sounded close to the lighthouse.

This part of the coast is a low sandy beach on which are heavy breakers; the sea is always disturbed on account of the currents which run past Ponta Albina in a violent and irregular manner, in a general northerly or north-westerly direction.

At about 2 miles offshore there are depths of 50 fathoms ($91^{m}4$).

Ponta Albina is very low and dangerous, and is said to be extending westward; great caution is necessary when approaching it at night or in thick weather.

From Ponta Albina, the coast trends southward for about 56 miles to the head of Baia dos Tigres. The depths average about 27 fathoms ($49^{m}4$) at about 5 miles from the coast, while the 100-fathom ($182^{m}9$) line is to be found between 5 and 23 miles offshore; the general nature of the bottom is sand or sandy mud.

Chart 1216.

Baia dos Tigres.—Shoal.—Caution.—From the head of Baia dos Tigres a narrow sandy tract of land, only a few feet high, known as Peninsula dos Tigres, extends in a north-north-westerly direction for about 20 miles, and protects the bay on its western side. The land on the eastern side of the bay consists of a succession of high sandhills, which rise abruptly from the coastline, and extend in broken and irregular ridges far inland, without a vestige of vegetation. *See* view facing page 245.

Great caution is necessary in approaching the coast in the vicinity of Baia dos Tigres, on account of the mist which is frequent, and which makes it difficult to judge distances, the first things then seen being the breakers off the coast.

Ponta da Marca (*Lat. 16° 31′ S., Long. 11° 43′ E.*) is the northern extremity of Peninsula dos Tigres.

Leão, the village or principal fishing station, is situated on the western side of the bay about 2 miles southward of Ponta da Armacão, situated about $3\frac{1}{4}$ miles southward of Ponta da Marca.

There is a Customs official, who is also the agent of the Captain of the Port at Mossamedes. No supplies are available, though fish may be caught in the seine. There is a refinery at Baia dos Tigres, which has its own drinking water installation, but the supply is only sufficient for local requirements. The fishing stations have greatly increased in size of late years, and a new station has been erected on the mainland abreast the village.

In 1938 the population of Leão was 500, of whom 60 were Europeans.

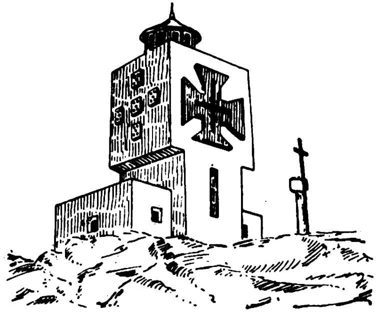
There is occasional steamship communication with Europe and with other ports in Angola.

Lights.—A light is exhibited, at an elevation of 53 feet ($16^{m}2$), from a white framework tower, 42 feet ($12^{m}8$) in height, situated near Ponta da Marca; *see* view facing this page. Near the light tower there is a group of small dwellings.

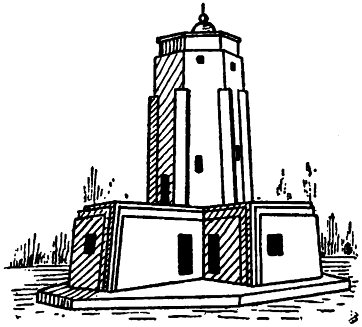
A light is exhibited, at an elevation of 32 feet ($9^{m}8$) from a water tank on the north-eastern corner of the Post Office at Leão. This light is visible only within the bay.

Shoal.—A shoal, with depths of from $4\frac{1}{2}$ to 5 fathoms ($8^{m}2$ to $9^{m}1$) over it, lies off the eastern shore of the bay about 6 miles south-eastward of Ponta da Marca light-structure, and $1\frac{1}{2}$ miles offshore.

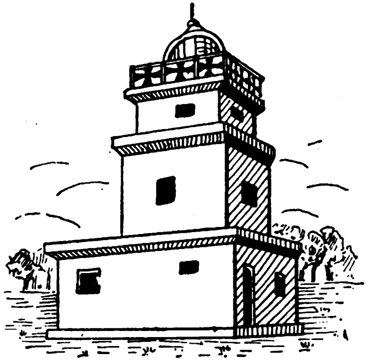
Charts 1013, 2202a, 2203, 2127.



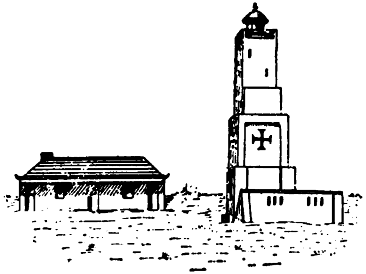
Cabo de Santa Maria lighthouse.



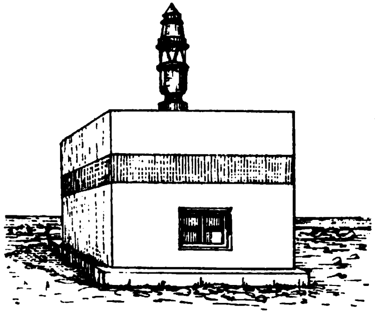
Cabo de Santa Marta lighthouse.
(*Originals dated* 1949.)



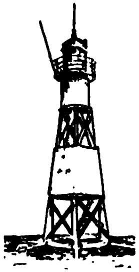
Ponta Grossa lighthouse.



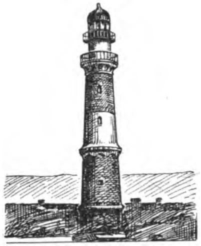
Ponta do Giraul lighthouse.
(*Original dated* 1949.)



Ponta do Noronha lighthouse.
(*Original dated* 1949.)



Ponta da Marca lighthouse.
(*Original dated* 1949.)



Swakopmund lighthouse.
(*Original dated* 1925.)

Chart 1216.

Anchorages.—Anchorage may be obtained in a convenient depth, with good holding ground, in any part of the bay, the chart being the best guide. There is no difficulty in fixing the position of the ship in the bay by cross bearings of the several fishing stations.

Anchorages are recommended in the following positions :—

(a) In Enseada das Barracas, in depths of 16 fathoms (29^{m}3), about 3 cables offshore and about 9 cables south-eastward of Ponta da Marca light-structure (*Lat. 16° 31′ S., Long. 11° 43′ E.*).

(b) About 2 cables south-eastward of Leão.

(c) In Enseada do Pau, in depths of 11 fathoms (20^{m}1), about 2 cables offshore and $3\frac{3}{4}$ miles southward of Leão.

(d) In Enseada dos Morrinhos, in depths of 9 fathoms (16^{m}5), 4 cables offshore, and about $7\frac{1}{2}$ miles southward of Leão.

(e) In the middle of the head of the bay, known as Saco dos Tigres, in depths of 6 fathoms (11^{m}0), about 9 cables offshore.

There are some huts at the fishing station at Ponta Cabinda, about $4\frac{1}{2}$ miles southward of Leão.

Chart 1806.

Coast.—From Ponta da Marca, the coast trends south-south-eastward, for about 20 miles to the isthmus at the head of Baia dos Tigres, and thence southward for about 24 miles, to the mouth of Rio Cunene. It consists entirely of sand crowned with dark tinted dunes which are visible from seaward at a distance of 15 or 16 miles.

Rio Cunene (*Lat. 17° 14′ S., Long. 11° 45′ E.*), which forms the boundary between Angola and South-West Africa, only reaches the sea in the rainy season, as during the dry season it is effectually barred by a sandbank on which the sea breaks furiously, especially at its southern end.

There are no off-lying dangers between Ponta da Marca and Rio Cunene, and the 100-fathom (182^{m}9) line is between 20 and 25 miles offshore.

Charts 1013, 2202a, 2203, 2127.

CHAPTER VII

RIO CUNENE TO ORANGE RIVER

CLIMATE AND WEATHER.—*See* page 56.

Chart 1806.

RIO CUNENE TO BIRD ROCK.—General remarks.—Caution.—The whole of the country which extends from Cabo Negro, *see* page 244, to beyond Itshabo island, *see* page 263, is a desert region, and almost rainless, though at times there are heavy dews.

Between Cape Frio and Walvis bay landing is difficult.

Great caution is necessary when navigating in the vicinity of the coast between Baia dos Tigres, *see* page 246, and Cape Cross, *see* page 250, as the charts are based on incomplete surveys.

Coast.—From the mouth of Rio Cunene (Kunene) (*Lat. 17° 14′ S., Long. 11° 45′ E.*), the coast trends in a southerly direction for about 45 miles, and thence in a south-south-easterly direction for about 30 miles, to Cape Frio. The northern portion of this part of the coast is backed by high shifting sand dunes, whilst from about 18 miles northward of Cape Frio, it is backed by high land.

Fria cove is situated about 9 miles northward of Cape Frio, and in its vicinity the coast is low and steep; the position is indicated by three hills, the central one of which is the highest.

Cape Frio is low and sandy, but has some hills behind it.

False Cape Frio is a slight projection, situated about 4 miles southward of Cape Frio, the intervening coast forming a slight indentation.

From False Cape Frio, the coast trends south-south-eastward for about 41 miles to Rocky (Fort Rock) point and presents an unbroken line of surf, the flat sandy foreshore rising to the Hartmann mountains, which attain heights of up to 3,360 feet (1,024^{m}1) about 40 miles inland. There is no landing place, and no trace of fresh water, nor has any indication of human habitation been reported.

Rocky point (*Lat. 19° 02′ S., Long. 12° 29′ E.*), or Guano cape, is a low, sandy, and prominent projection, which cannot be mistaken; close to it there is a large rounded block of granite, that is conspicuous for its whiteness, apparently a covering of guano.

Dangers.—Anchorages.—A rock, 10 feet (3^{m}0) high, lies close inshore about 20 miles southward of the mouth of Rio Cunene, and the intervening coast is safe; but from 10 to 28 miles southward of the rock, foul ground fringes the coast.

A shoal, marked by breakers, over which a depth of 5 fathoms

Charts 1013, 2202a, 2203, 2127.

Chart 1806.

($9^{m}1$) is charted, but upon which the depth is probably less, was reported by H.M.S. *Alecto*, in 1889, to lie 2 miles offshore, and about 15½ miles southward of the 10-foot ($3^{m}0$) rock.

H.M.S. *Mutine* reported, in 1911, a rock which breaks occasionally, about 5 miles offshore, and another that seldom breaks, about 2½ miles offshore, lying about 3 miles south-westward and 7 miles southward, respectively, of the shoal reported by H.M.S. *Alecto.*

The British s.s. *Clan Alpine* is reported to have struck a shoal, in January 1890, when drawing 21½ feet ($6^{m}5$), lying about 29 miles north-north-westward of Cape Frio. The shoal is stated to be from 3 to 5 miles offshore, but its exact position is doubtful.

Discoloured water has been reported between the Clan Alpine shoal and the rocks reported by H.M.S. *Mutine.*

A rock, the position of which is doubtful, and the depths over which is not known, was, in 1943, reported to lie about 22 miles north-westward of Cape Frio.

The depths are probably less than charted north-westward of Cape Frio, as the German man-of-war *Hyane* observed breakers, during a moderate south-south-westerly gale with a high sea, in a position 2 miles west-north-westward of Cape Frio.

In 1907, breakers were reported by the s.s. *Windhuk*, in a position about 3 miles from the coast, and 8 miles south-south-eastward of False Cape Frio (*Lat. 18° 29′ S., Long. 12° 02′ E.*).

Southward of the breakers reported by s.s. *Windhuk*, the coast as far as Rocky point is apparently free from dangers, with the exception of some foul ground, with breakers, that extends about one mile offshore, about 4 miles northward of the point; there are depths of from 8 to 10 fathoms ($14^{m}6$ to $18^{m}3$) close inshore.

H.M.S. *Swallow* anchored, in 1879, in a position about 1¼ miles northward of False Cape Frio. In this position a depth of 8 fathoms ($14^{m}6$), sand and mud, was found. Vessels should use this anchorage with caution.

Temporary anchorage may be obtained by vessels with local knowledge, in a depth of 8 fathoms ($14^{m}6$), at about one mile north-westward of Rocky point, but there is no safe landing place.

Coast.—From Rocky point, the flat, rocky, surf-beaten coast trends south-south-eastward, for about 185 miles, to Cape Cross; sand hills of moderate elevation, extending as far as the eye can see, continue mile after mile, and are varied occasionally by signs of vegetation.

The mouth of Hoarusib river, situated about 6 miles south-south-eastward of Rocky point, is reported to be invisible during the dry season; the probability is that it is then closed.

Mowe point is situated, at the southern end of a slight indentation, about 19 miles south-south-eastward of Hoarusib river.

Near the coast, about 37 miles south-south-eastward of the mouth of Hoarusib river, is a sharp sand cone, 7 miles south-south-eastward of which is a sand table-hill, and 2 miles further in the same direction is a striped sand hummock.

Dune point is an eminence situated about 2½ miles inland, and 16 miles south-south-eastward of the striped sand hummock. About 15 miles further south-south-eastward is a moderately high sand cliff, about 2½ cables long, in which is the mouth of River Uniab, a periodical

Charts 1013, 2202a, 2203, 2127.

Chart 1806.

river with a sandbank stretching across the middle two-thirds of its entrance. There are rushes and reeds in the river bed, as well as an abundance of green bushes on the adjacent dunes. At a distance, the entrance appears as two creek-like openings in the cliff.

Palgrave point (*Lat. 20° 28′ S., Long. 13° 17′ E.*) is a slight projection, from which a line of breakers extends in a north-westerly direction for 6 or 7 cables, situated about 29 miles south-south-eastward of Dune point.

Great Table mountain, situated about 16 miles north-eastward of Palgrave point, and 12 miles inland, is rocky and prominent, and southward of it is Sugar Loaf hill, situated about 9 miles east-north-eastward of Palgrave point.

About 27 miles south-south-eastward of Palgrave point there is a break in the coast, formed by the mouth of River Huab, the bed of which is usually dry, the foreshore in its vicinity being of moderately high rock.

Ambrose bay is small, and is situated about 38 miles south-south-eastward of Palgrave point. In the bay there is a depth of about 3½ fathoms ($6^{m}4$) at a distance of about half a mile offshore ; there are several shoals in its southern part.

The mouth of River Ugab, the bed of which is usually dry, lies about 8 miles south-south-eastward of Ambrose bay.

Cape Cross, situated about 49 miles south-south-eastward of Ambrose bay, projects about 2½ miles from the general line of the coast ; it is a barren spit terminating in black rocks, or low cliffs, and is the seaward end of a chain of red sandstone hills, to which it is connected by a low sandy plain. These hills penetrate into the interior in an easterly direction, and form a good mark from seaward The cape is low, and the land in its vicinity is of a red colour ; it is difficult to distinguish, and, at a distance, its extremity appears as an island. On the cape is a granite cross. Inland from the cape, flat, sandy, and rocky plains continue for some miles, rising to barren hills and mountains.

About 21 miles north-north-eastward of Cape Cross (*Lat. 21° 47′ S., Long. 13° 57′ E.*), is the highest and most prominent peak of the whole mountain range that runs parallel with the coast, and of which Sugar Loaf hill is a prominent part. This peak, which is known locally as Samanbis Berg, is 2,346 feet ($715^{m}0$) high, and has a nearly perpendicular fall at its southern end, with abrupt faces eastward and westward. About 30 miles further north-eastward Brandberg rises to an elevation of 8,550 feet ($2{,}606^{m}0$), about 45 miles from the coast.

Cape Cross bay, on the northern side of the cape, is said to be free from dangers. There is a settlement, with a flagstaff, on the shore of the bay, in connection with the export of guano.

Dangers.—Anchorages.—The coast from Rocky point to Cape Cross is apparently free from dangers, as with the exceptions mentioned below, there are depths of not less than 10 fathoms ($18^{m}3$) at a distance of about one mile offshore.

Swallow Breakers, over which the sea usually breaks, are situated about 5 miles southward of Dune point, and extend in a south-westerly direction for a distance of about 2 miles from the coast. When in the vicinity of this shoal ground, great caution should be exercised, as soundings give little warning, and it is possible that, after a continuance of fine weather, the sea may not break.

Charts 1013, 2202a, 2203, 2127.

Chart 1806.

A rock, the depth over which was not ascertained, was reported, in 1915, to lie about 5 miles north-north-westward of Palgrave point, at about 2½ miles from the coast; but its exact position is doubtful.

Anchorage may be obtained, by vessels with local knowledge, in a depth of 10 fathoms ($18^{m}3$), sand and mud, immediately northward of Palgrave point, with the outer breaker bearing 178°. This anchorage is protected from the rollers to a certain extent, and with a southerly wind is considered safe, but a vessel should always be ready to put to sea on the approach of a south-westerly gale. There is no landing place.

Ogden rocks (*Lat. 21° 04′ S., Long. 13° 33′ E.*), on the southern side of Ambrose bay, lie about 1½ miles offshore; they break and should be approached with great caution.

Anchorage may be obtained, by vessels with local knowledge, in Ambrose bay, with a prominent cone-shaped hillock bearing 056°, distant 1¾ miles. Landing is difficult, and the anchorage is unprotected and bad. When visited by the German man-of-war *Sperber*, in 1907, no trace of human habitation could be found, and there appeared to be no fresh water.

Shoal water, with depths of less than 5 fathoms ($9^{m}1$), exists near the coast at about 8 miles northward of Cape Cross, and hereabouts the 10-fathom ($18^{m}3$) line is to be found about 5 miles offshore; a reef about half a cable long, extends off the cape, and terminates abruptly in a depth of 9 fathoms ($16^{m}5$). The sea breaks heavily on the cape.

Good anchorage, on a sandy bottom, may be obtained, by vessels with local knowledge, anywhere in Cape Cross bay in moderate weather. The best berth is stated to be in a position from which the settlement flagstaff bears 115°. Landing is usually rather difficult, and in bad weather is sometimes impossible. Four iron boilers, lying near the shore, kept open a little northward of a small black rock on the beach, will lead to the landing place.

Coast.—From Cape Cross, the coast curves in a south-easterly to south-south-easterly direction for about 63 miles to Swakopmund road, and is generally clear; there are depths of 10 fathoms ($18^{m}3$) about 3 miles offshore, but, owing to the low nature of the coast and the irregularity of the soundings outside these depths, the greatest caution must be exercised when approaching it in misty or foggy weather, and at night.

Sierra bay extends from Cape Cross for about 9 miles in a south-easterly direction to the low and sandy Sierra point; the bay being exposed to westerly and south-westerly winds, as well as to the almost constant swell, is not a good anchorage, though it is sometimes frequented by whalers.

Farilhao point (*Lat. 22° 10′ S., Long. 14° 17′ E.*) is situated about 20 miles south-eastward of Sierra point.

The mouth of Omaruru river is situated about 3½ miles northward of Farilhao point, and the intervening coast forms a small bight. A road connects Farilhao point with Swakopmund.

Rock bay (Wüsten bay) is situated about 18 miles south-south-eastward of Farilhao point; it affords no shelter, though at times it is frequented by whalers.

Hanoas Berg (Mount Quanwas) is remarkable, and rises, about 22 miles east-south-eastward of Rock bay, to an elevation of 2,310 feet

Charts 1013, 2202a, 2203, 2127.

Chart 1806.

(704^{m}1); it has several sharp peaks which are inclined towards the north-east, and near it, at an elevation of about 40 feet (12^{m}2) is a lake. In this vicinity are a few patches of stunted bushes, almost the last signs of vegetation to be seen when proceeding towards the Cape of Good Hope. Northward of Hanoas Berg is a peculiar thumb-shaped mountain of about the same height. *See* view facing page 262.

Beacons.—There is a black tripod beacon, surmounted by a diamond, on Schwarze Klippen hills, near Rock bay, and near the southern point of the bay are two pole beacons which are difficult to distinguish. In the vicinity of Rock bay, and between it and Swakopmund road, there are in addition nine black tripod beacons, having various top marks, five of which are erected near the coast, and the remainder from 1½ to 4 miles inland.

Chart 1013.

Magnetic Anomaly.—A magnetic anomaly was reported, in 1951, between latitudes 21° 48′ S. and 24° 00′ S., and longitudes 7° 48′ E. and 9° 36′ E., about 280 miles westward of Walvis bay.

Chart 1806, plan of Swakopmund road.

Swakopmund road.—Anchorage.—This is an open roadstead situated about 15 miles southward of Rock bay.

Northward of the town, there are depths of 3 and 5 fathoms (5^{m}5 and 9^{m}1) about 2 and 5½ cables, respectively, offshore; but there are out-lying detached patches, over which the depths vary from 4¼ to 3¾ fathoms (7^{m}8 and 6^{m}9), situated about 7 cables from the lighthouse between lines drawn 297° and 267° from it.

Swakop reef, with depths of less than 5 fathoms (9^{m}1) over it, extends about 7 cables from the coast southward of the town.

A pinnacle rock, over which there is a depth of 4¼ fathoms (7^{m}8), lies off Swakop reef, about one mile south-westward of the lighthouse.

Anchorage may be obtained, in a depth of about 6½ fathoms (11^{m}9) sand and mud, with the lighthouse bearing 075°, distant about 6½ cables.

Light.—Radiobeacon.—A light is exhibited, at an elevation of 115 feet (35^{m}0), from a white granite tower, 92 feet (28^{m}0) in height, with a red band, at Swakopmund (*Lat. 22° 41′ S., Long. 14° 31′ E.*).

A radiobeacon is situated at the lighthouse.

Swakopmund.—This town is a holiday resort and is no longer used as a port. A magistrate resides in the town and there is a large private hospital.

In 1951, the population numbered 1,600 Europeans and 1,500 others.

There were formerly two piers in use, one close westward of the lighthouse and the other about 4 cables southward, but both are now entirely silted up, and, in 1938, were inland.

Landing on the beach is practically impossible, even in fine weather.

The town is connected to the general telegraph and telephone system and to the railway system of the Union of South Africa.

The mouth of Swakop or Zwakaub river is situated close southward of the town, but the river is dry except during one or two months in the summer, and its entrance, about 2 cables across, is blocked by a sand bar; the entrance is indicated by thick green foliage, and has rocks on its southern side, whilst the buildings of the town are on the northern bank of the river bed.

There is a beacon on the southern side of the river entrance, about 1½ miles southward of Swakopmund lighthouse.

Charts 632, 1013, 2202a, 2203, 2127.

Chart 3859.

Coast.—Beacon.—From the mouth of the Swakop river the coast trends southward for about 12 miles to Bird rock, which is flat and resembles a pier from seaward; on it is erected a wooden platform for the collection of guano; it dries 4 feet ($1^{m}2$). The shore abreast the rock has a bed of granite, with a large accumulation of seaweed at high-water mark, which gives to that part a dark colour and rocky appearance.

A shoal extends about 4 cables from a position on the coast situated about 2 miles southward of Swakopmund.

Caution reefs, on which there are several above-water rocks, extend about 3 cables offshore from a point situated about 4½ miles southward of Swakopmund.

There is a black tripod beacon, surmounted by a sphere, on the point from which Caution reef extends.

Chart 629.

WALVIS BAY.—Caution.—This bay is entered between Bird rock and Pelican point (*Lat. 22° 53′ S., Long. 14° 26′ E.*), the northern extremity of Walvis peninsula, situated about 5 miles westward of it.

Owing to the low nature of the coast, and the irregularity of the depths offshore, the greatest caution must be exercised when approaching Walvis bay in thick or foggy weather, or at night.

On the 1st June, 1900, an island of mud or clay, 150 feet ($45^{m}7$) long, 30 feet ($9^{m}1$) wide, and 12 feet ($3^{m}7$) high, was formed by volcanic action, off the north-eastern extremity of Pelican point, at a distance of about 100 yards ($91^{m}4$) from the shore. Depths of from 7 to 10 fathoms ($12^{m}8$ to $18^{m}3$) were obtained all round this island and between it and Pelican point, and steam was observed rising from the clay composing it. Within three months of the date of the upheaval the island had disappeared.

The country between Swakop river and the head of Walvis bay, with the exception of a narrow strip along the coast, is covered with sandhills, 300 to 350 feet ($91^{m}4$ to $106^{m}7$) high. The sand dunes near the shore on the eastern side of the bay are from 10 to 80 feet ($3^{m}0$ to $24^{m}4$) high, and are sparsely covered with creepers and stunted bushes; a large tract of these hills is partly inundated when Kuiseb river, flowing into the head of the bay, is in flood.

Walvis peninsula is composed entirely of sand and extends from the coast, in a northerly direction for about 5 miles, forming the western side of Walvis bay; it has a general height of only from 2 to 4 feet ($0^{m}6$ to $1^{m}2$), though here and there are a few dunes, from 8 to 10 feet ($2^{m}4$ to $3^{m}0$) high, which are constantly changed in shape and position by strong south-westerly winds.

Light.—Fog signal.—A light is exhibited, at an elevation of 112 feet ($34^{m}1$), from a circular tower situated about half a mile southward of Pelican point. The upper part of the lighthouse is painted red and white, the middle part red and yellow, and the lower part black and yellow. A fog signal is sounded from the light-tower.

Beacons.—A white pyramidal beacon, surmounted by a ball, 41 feet ($12^{m}5$) in height, is situated on Walvis peninsula, about half a mile south-westward of Pelican Point light-beacon.

In addition to the pyramidal beacon, there are numerous beacons, with various topmarks, on Walvis peninsula, the positions of which

Charts 632, 1013, 2202a, 2203, 2127.

are indicated on chart 629. These beacons were, in 1938, mostly in a bad state of repair; it was reported then that they would not last long, and would not be replaced, so they must not be considered as navigational marks.

A beacon, consisting of three upright spars with two red and white battens, 36 feet (11^m0) high, stands on the shore about 11½ cables southward of the centre of Bird rock.

Lagoon beacon (*Lat. 22° 58′ S., Long. 14° 28′ E.*), consisting of three vertical spars with small cross-bars, 37 feet (11^m3) high, stands on the western side of the lagoon at the head of the bay.

Light-buoys.—All buoys, no matter of what colour, soon assume a white appearance, owing to their being covered with guano by the teeming bird life of this area. A light-and-bell-buoy, Spit No. 2, painted in black and red vertical stripes, and exhibiting a *white flashing* light *every six seconds,* is moored about 11 cables northward of Pelican point. The buoy is withdrawn for overhaul, annually, on about 1st March and is replaced by an unlighted red can buoy without a bell.

A light-buoy, exhibiting a *white flashing* light showing a *short* flash *every second,* is moored about 2½ miles northward of the main wharf at Walvis bay settlement and about 6 cables northward of the entrance to the dredged channel leading to the dredged area fronting the above wharf.

Anchorage.—Anchorage, suitable for large vessels, can be obtained in a depth of 5 fathoms (9^m1), mud and shells, with the head of the north-easternmost pier situated about 3 cables south-westward of the wharf, bearing 161°, distant 2 miles; and for small vessels in a depth of 3 fathoms (5^m5) with the head of the same pier bearing 161°, distant about one mile. There is, however, good anchorage anywhere in the bay, according to draught.

Dredged channel.—Buoys.—A dredged channel about 2 miles long extends in a northerly direction from the wharf at the Walvis bay settlement; the channel is 440 feet (134^m1) wide, and was, in 1949, dredged to a least depth of 29 feet (8^m8).

The channel is marked on the eastern side by black can buoys Nos. 1 to 9, and on the western side by red conical buoy No. 1 and white conical buoys Nos. 2 to 7.

Leading lights.—Beacons.—A beacon consisting of a square board, painted black and white diagonally, is placed on the roof of a shed about 9 cables north-north-westward of the radio mast, *see* below.

A beacon, consisting of a mast surmounted by a triangle, painted black and white horizontally, stands about 4½ cables north-westward of the radio mast (*Lat. 22° 58′ S., Long. 14° 30′ E.*).

When vessels are entering or leaving the port, lights are exhibited from these beacons, which, when in line bearing 183°, lead through the dredged channel into the port.

Between March and November, numerous whaling craft, which exhibit no lights by night, are laid up at anchor north-eastward of the dredged channel, inside depths of 3 fathoms (5^m5).

Weather.—The swell off this part of the coast is normally moderate south-westerly, becoming heavy from that direction after the passage of a deep depression at the Cape of Good Hope. A north-westerly swell of any magnitude is rare and there is seldom enough in the bay to

Chart 629.

interfere with fuelling or watering vessels at anchor. With the strong easterly winds of winter there may be considerable sea running, out in the bay, and the strong afternoon sea breeze may also cause a lively sea, especially after several consecutive days in summer, making boatwork unpleasant though not impossible.

Sea fogs are frequent off this coast at all seasons, but are more so, near the shore, in winter. They may appear at any time of the day with a south-westerly wind, even of force 5, and in winter with a north-westerly wind. The low sandy nature of the coastline renders it very dangerous to approach during fog, so that great caution is needed. The fogs may persist over the sea for several days, but normally they cover only the bay and the buoyed approach channel to the wharf during the night and early morning, receding seawards before noon until after dark when they may again approach the land, so that it is possible to enter the port on most afternoons even in foggy spells. An exception to this is the fog brought by north-westerly winds which may approach and cover the bay at any time of the day, remaining normally until the following morning. During the winter, land fogs frequently form after a clear dawn and drift over the bay, but these are usually of short duration and always disperse by noon.

Directions.—Pilotage.—The entrance to Walvis bay is difficult to make out from seaward, even when approaching from southward. Approaching from northward or north-westward it is recommended to sight Swakopmund first; the settlement at that place is very conspicuous, especially when the sun is shining on the roofs of its buildings, making them visible in misty weather long before the land is sighted.

Approaching from southward, the buildings at Walvis bay settlement will first be seen over the peninsula, and if the weather is clear no difficulty will be experienced in entering the bay.

As it was reported, in 1928, that the depths off Pelican point (*Lat. 22° 53′ S., Long. 14° 26′ E.*) were constantly altering, and the point was extending north-eastward, vessels should pass close to the position of the bell-buoy; large patches of discoloured water were then seen off the point. In other respects there is no difficulty in entering the bay.

In Walvis bay, the cold-storage buildings and its chimney at the north-eastern end of the wharf at the settlement, the sheds and cranes on the wharf, the whaling station and two white tanks about three-quarters of a mile north-eastward of it, a large shed near the old pier south-westward of the wharf, also the radio mast, 275 feet ($83^{m}8$) high, situated about one mile southward of the wharf, are the most conspicuous objects. The cold-storage and fishery works are brilliantly illuminated at night when working, as is also the whaling station during the season, May to October; these lights are useful marks when approaching the anchorage at night. There is a clock tower at the north-eastern end of one of the sheds on the wharf.

To avoid delay in entering due to mist, it would be advantageous, when possible, to arrange the time of arrival off the entrance to the bay to be not earlier than noon; though as the fog is at a maximum in the early morning and forenoon, and as the early part of the night is for the most part clear, vessels can nearly always enter the bay during the night, and could proceed alongside the wharf after daybreak, with the assistance of a pilot, even should the weather be thick.

Charts 1806, 632, 1013, 2202a, 2203, 2127.

Chart 629.

Pilotage is compulsory for merchant vessels entering, leaving, or when shifting berth in, Walvis bay. *See* page 45. Vessels arriving during the night, and wishing to proceed alongside, must anchor close to the light-buoy northward of the entrance to the dredged channel, where they will be boarded by the pilot in the morning.

Port regulations.—The regulations for the harbours of the Union of South-West Africa are in force at Walvis bay; *see* page 45.

Climatic table.—*See* page 77.

Port limits.—The limits of the port are enclosed by an area bounded by the shores of the bay and lines drawn 000° for a distance of 1½ miles from Pelican point light-beacon, and thence 090° to the coast, together with the foreshore therein and the jetties, harbour works and harbour lands vested in the Government of the Union of South Africa.

Wharf.—**Piers.**—There is a reinforced concrete wharf, known as Hofmeyr wharf (*Lat. 22° 57′ S., Long. 14° 30′ E.*), about 3 cables north-eastward of the north-easternmost pier at the settlement. It is 1,500 feet ($457^{m}2$) in length; in 1950, there were depths of 29 to 30 feet ($8^{m}8$ to $9^{m}1$) alongside the wharf, and the same depth extends 100 feet ($30^{m}5$) from it into the dredged area fronting the wharf, which elsewhere had been dredged, in 1950, to a least depth of 30 feet ($9^{m}1$). The wharf has large goods sheds upon it, and is fitted with five 4 ton, and one 7 ton, electric cranes; it is also connected to the railway system of the Union of South Africa.

The dredged area off-lying the wharf has a length of 2,150 feet ($655^{m}3$), and increases in a north-easterly direction from 750 feet ($228^{m}6$) to 1,400 feet ($426^{m}7$) north-westward from the wharf; it is marked with buoys on its northern side.

Close north-eastward of the wharf, there is a wooden jetty, which had, in 1928, a depth of 12 feet ($3^{m}7$) alongside its **T**-shaped head; between the wharf and the wooden jetty is a boat jetty with a depth of 5 feet ($1^{m}5$) alongside the steps.

There is a wooden pier at the whaling station, 55 feet ($16^{m}8$) long, with a depth of 7¾ feet ($2^{m}3$) alongside its **T**-shaped head; several mooring buoys lie off this pier.

The piers south-westward of the wharf are now only used by fishing craft; the north-easternmost is 675 feet ($205^{m}7$) in length, and had, in 1936, a depth of 8 feet ($2^{m}4$) at its head.

Settlement.—A township has been laid out at Walvis bay. In 1951, there was a population of 2,950, of whom 850 were Europeans. The natives live in a large location southward of the township. There is a state-aided hospital, a small government hospital and a police post.

The fishing industry is important and Walvis bay will eventually be the base of the new Tuna fishing industry.

The whaling station consists of several buildings and a look-out platform; it has five chimneys, of which four are each 40 feet ($12^{m}2$) high, whilst the fifth is about 55 feet ($16^{m}8$) in height. This station, in 1938, was used only as a repair depot.

The principal imports are general cargo and timber; and the exports are copper ore, vanadium, lead, frozen meat, guano and fish.

Close westward of the settlement is the mouth of Kuiseb river (*Lat. 22° 58′ S., Long. 14° 29′ E.*), the water of which always reaches the sea, but as for the last 60 miles of its course there is sand in the river bed to a depth of 30 feet ($9^{m}1$) and upwards, it is only in years

Charts 1806, 632, 1013, 2202a, 2203, 2127.

Chart 629.

of exceptional rainfall in the interior that the whole of this sand becomes saturated and the river appears on the surface. The bed of the river in places exceeds one mile in width, and there is a considerable amount of vegetation in its vicinity; but a new course is formed each time the river runs above ground. Flood time is about February to March.

Port facilities.—Communications.—Fuel oil is available and approximately 4,700 tons are kept in stock.

Ships can be supplied with coal, by crane, at the rate of 25 tons per hour.

Fresh water can be supplied at the rate of 40 tons per hour.

Meat, fresh or frozen, can be obtained in any quantity, ice can also be had, as well as a limited quantity of ship's provisions; any quantity of the latter could be obtained at short notice. Fish are plentiful, except during eruptions which periodically occur on the sea bottom, and can be caught in the seine, the best places being on the inside of the peninsula, and near the mouth of the lagoon.

One sea-going tug fitted with salvage and fire appliances, and one smaller tug are available. Three lighters are available with capacity of 300 tons.

There is a patent slip, situated about 1¼ cables north-eastward of the wharf; for particulars *see* Appendix II.

The climate of Walvis bay is generally healthy, and there is no malaria.

Walvis bay is connected to the South African Railway system, and to the general telegraph and telephone systems.

There is a radio station at Walvis bay; *see* page 44.

There is occasional sea communication with Europe and Cape Town.

Life-saving.—A line throwing apparatus is maintained at the settlement.

Shipping.—In 1949–50, a total of 396 vessels with a gross tonnage of 1,444,438 tons entered the harbour.

Chart 632.

PELICAN POINT TO NORTH-EAST POINT.—Aspect.—Nothing can be more uninviting than the appearance of the coast between Walvis bay and the mouth of Orange river, situated about 375 miles southward; it is composed of a long range of sandhills, excepting that portion which lies between Spencer and Hottentot bays, where there is a range of barren, desolate dunes, from 500 to 600 feet (152^{m}4 to 182^{m}9) high, more forbidding in aspect, if possible, than the rest of the coast.

Chart 3859.

Coast.—From Pelican point (*Lat. 22° 53′ S., Long. 14° 26′ E.*) a low sandy coast trends in a southerly direction for about 27 miles to Sandwich harbour, locally known as Sandfish harbour. Since the survey of this so-called harbour was made in 1880, considerable changes have taken place, and the entrance is now entirely closed. The harbour was formed between a low sandy peninsula, on its western side, terminating in Ilheo point, and the mainland on its eastern side. The peninsula is nearly level with the sea; its highest point, which has an elevation of about 16 feet (4^{m}9), is on its western side. The mainland eastward of the harbour consists of sandhills from 400 to

Chart 3859.

600 feet (121^{m}9 to 182^{m}9) high. Lagoon point on the eastern side of the port was sandy; it had a few rocks off it, and a store house upon it. At about 3½ miles within the entrance to the harbour was a watering place, apparently one of the mouths of the Kuiseb river, the presence of which was indicated by reeds less than 20 yards (18^{m}3) from the beach. Guano is exported from Sandwich harbour, *see* page 19.

About three-quarters of a mile south-westward of Ilheo point, in fine weather, temporary anchorage can be obtained by vessels with local knowledge, and landing is possible.

Discoloured water.—The water in the vicinity of Sandwich harbour, and for a few miles southward of it, has been observed to be very light in colour. This discoloration extended from 2 to 3 miles offshore, and the line of demarcation between it and the blue water seaward was clear and distinct. The depths at about one-quarter of a mile inside this line were found to be from 13 to 14 fathoms (23^{m}8 to 25^{m}6), sand.

Coast.—Beacons.—From a point about 4½ miles south-south-westward of Ilheo point, the coast trends southward for about 30 miles to Conception bay; it is backed by shifting sand dunes, from 330 to 500 feet (100^{m}6 to 152^{m}4) high, and is fringed with a bank which is fairly steep-to, there being depths of 10 fathoms (18^{m}3) about one mile offshore.

Chart 3859, plan of Conception bay.

Conception bay is a slight indentation, and affords no shelter whatever; it is visited only by small vessels for the provisioning of the settlement of the diamond mining company, situated about 9 miles inland. There are two beacons on the coast near the head of the bay, which in line, bearing 102°, lead to the best anchorage.

The coast in this vicinity was reported, in 1938, to lie from 1 to 2 miles further westward than charted.

Chart 3859.

A stranded wreck with its masts and funnel standing, lay, in 1909, high and dry, about 5 miles south-westward of the beacons in Conception bay, and formed a good landmark; it was still conspicuous in 1936. There is a beacon situated on the coast in the vicinity of this wreck, and another about 1¾ miles northward.

Chart 3860.

From the position of this wreck, the coast trends south-south-eastward for about 30 miles to Black reef (South rocks) which lies near the shore northward of a point on which there are two beacons; about midway between Black reef and North rocks, about 2¾ miles northward and which also lie close offshore, is Meob (Mutzel) bay, a slight indentation in the coast.

Hollam's Bird island.—Anchorage.—This singular rock (*Lat. 24° 38′ S., Long. 14° 32′ E.*), situated about 7 miles south-south-westward of Black reef, and 6 miles offshore, is about 40 feet (12^{m}2) high; it is one of the Government Guano islands. For distances of 3 miles south-westward, 1½ miles southward, and about 4 miles northward of the rock there are patches over which the depths are from 9 to 10 fathoms (16^{m}5 to 18^{m}3). Breakers were reported, by the m.v. *Koenigsberg* in 1939, in a position about 6 miles south-south-westward of Hollam's Bird island. *See* page 19.

Charts 1013, 2202a, 2203, 2127.

Chart 3860.

A pair of sheers on the island are conspicuous when seen from seaward.

Anchorage may be obtained, in a depth of about 15 fathoms (27^{m}4), from half a mile to one mile northward of the island.

Landing is at all times difficult, and often impracticable, as the surf breaks all round the island. The best season for landing is March and April, and the best time usually in the early morning. Landing is comparatively easy, by means of the sheers, once a party has been placed on the island to work them, but until this has been done it is difficult. No boat is kept on the island.

The reef is frequented by a vast number of right whales during the months of July and August, and the place is the resort of seals, gannets, and penguins. The sea in the vicinity abounds in many kinds of excellent fish, which may be caught with hook and line in great quantities. A few turtle also may be found on a small sandy beach on the eastern side of the islet.

Coast.—From the point southward of Black reef, the coast trends in a south-south-easterly direction for about 25 miles, forming a bight with a low sandy beach marked by patches of black rocks, and terminating in some conspicuous white sand patches on the coast. This part of the coast is lower than that southward of it, and is difficult to distinguish on account of the heavy surf and spray which envelop it.

These white sand patches are very conspicuous in the afternoon, when the sun shines on them. It is difficult to say of what these patches consist, for the whole country in the vicinity is sand, but whereas it is generally of a yellowish appearance, these patches are quite white, coming down to a point towards the base of the hills, and spreading out above in a fan-shape, or like a rudely-formed letter **T**.

Some conspicuous black rocks with a flat-topped rock close off them, lie about 2 miles southward of the conspicuous sand patches described above.

Sylvia hill (*Lat. 25° 09′ S., Long. 14° 51′ E.*) which is 820 feet (249^{m}9) high, is situated about 12 miles southward of the black rocks, the intervening coast forming a bay, the southern part of which is known as St. Franciscus (Francis) bay; the hill is sharp, and double-peaked, and stands closely over a rounded point; being higher than the surrounding country it is prominent when seen from south-westward.

The coast between Sylvia hill and Easter point, about 9 miles southward, is sandy, and behind it there is a range of hills, known as Uri Hauchab, of which the highest is known as Harus and is 2,460 feet (749^{m}8) high.

Oyster (Easter) cliffs, situated about 3½ miles southward of Easter point, are high and rugged sand-cliffs, extending about 3 miles.

Dangers.—Between Sylvia hill and a point on the coast about 5 miles southward, the coast is foul, when in depths of less than 6 fathoms (10^{m}9).

Breakers extend for some distance off the coast immediately northward of Oyster cliffs. The coast in this locality should not be approached within 2½ miles, at which distance from it the depths will be from 10 to 20 fathoms (18^{m}3 to 36^{m}6), uneven bottom.

Chart 632.

Off-lying bank.—A bank (*Lat. 25° 31′ S., Long. 12° 55′ E.*), over

Chart 632.

which there is a depth of 27 fathoms (49^m4), was reported by s.s. *Titania*, in 1904, to exist about 104 miles westward of Oyster cliffs.

Chart 3860.

Coast.—Southward of Black cliffs, about 2 miles southward of Oyster cliffs, the coast is sandy for about 3½ miles, and forms a slight indentation, terminating in Knoll point, which is rocky but inconspicuous (*Lat. 25° 28′ S., Long. 14° 50′ E.*).

Charts 3862, 3860.

Southward of Knoll point, the coast forms an open bay, the entrance to which is about 8 miles wide to some high cliffy land at its southern end; these cliffs extend about 5 miles to Nordhuk (North point), the northern entrance point of Spencer bay; North head, 852 feet (259^m7) high, rises steeply from Nordhuk. At about 2 miles southward of Knoll point are several small sand cliffs; and the shore of the bay rises to a chain of coastal hills, forming an unbroken and somewhat high and level range of sandhills, which have no marks whereby they can be distinguished from one another.

The wreck of a steamer, which, in 1931, appeared like a vessel at anchor, lies close offshore about 7 miles southward of Knoll point.

Chart 3862, plan of Spencer bay.

Spencer bay.—Nordhuk is high and sandy, and is the southern termination of North head, the high cliffy land described above.

Südhuk (Dolphin head), the southern entrance point of Spencer bay and the northern extremity of South head, is situated about 2½ miles southward of Nordhuk; it is of most remarkable formation, being high, steep, and rocky, and rising almost perpendicularly from the sea to an elevation of over 600 feet (182^m9). *See* view on charts 3862, 632. When seen from a few miles northward of Spencer bay, Südhuk has the appearance of an island, and bears a slight resemblance to the rock of Gibraltar, *see* view facing page 262.

Nordhuk and Südhuk are the most remarkable features on this part of the coast.

During bad weather the sea breaks over the beach in Spencer bay for a considerable distance, and forms several lagoons in the little hollows behind it, which are frequented by numbers of flamingoes and other birds. Whales visit the bay during the months of July and August. The country inland abounds in game.

Merker island.—Merker (Mercury) island (*Lat. 25° 43′ S., Long. 14° 50′ E.*), situated about half a mile northward of Südhuk, is a bleak rugged rock, 125 feet (38^m1) high, which has the appearance of a sharp white pyramid, is very steep and even precipitous in places, *see* view facing page 262. It is one of the Government guano islands, *see* page 19, and the excretions of the birds render foothold often precarious, not to say dangerous, unless care be taken. During the guano season, April to August, the island is inhabited, and landing may then be effected with comparative ease, even in moderately bad weather; but at other seasons it would probably be attended with much difficulty.

A shoal extends from the north-eastern side of the island, a depth of 22 feet (6^m7), rock, being found about 2 cables eastward of its northern extremity. The other sides of the island are apparently fairly steep-to. The waves at times beat against the shores of this island with indescribable fury, and rush into an immense cavern, 84 feet (25^m6) high, through several openings, with a terrific noise.

Charts 1013, 2202a, 2203, 2127.

Chart 3862, plan of Spencer bay.

The landing place is just southward of a narrow gully at the north-eastern end of the island. The only danger to be avoided when approaching it is a round-topped rock which sometimes uncovers with the swell, and which lies close to the spot that a stranger would make for as affording the best place alongside which to run. The boat should pass close northward of this rock, letting go an anchor offshore.

A bank, on which the depths are less than 5 fathoms (9^{m}1), extends about half a mile from the mainland eastward of Merker island, leaving only a narrow channel, about 1½ cables wide, with depths in it of from 5¾ to 6 fathoms (10^{m}5 to 11^{m}0), between it and the shoal extending from the island.

The sea has been observed to break heavily, but only in bad weather, with a very heavy swell, rather more than half a mile north-eastward of Merker island, though in this position there is a depth of 8 fathoms (14^{m}6).

Anchorage.—Vessels can enter Spencer bay on either side of Merker island. The best anchorage is in a depth of 6 fathoms (11^{m}0), about 3 cables eastward of the northern extremity of the island; but this position is only about three-quarters of a cable from the 22-foot (6^{m}7) rock. Vessels loading guano lie at a distance of a little over 2 cables from the coast of the island. It is inadvisable for vessels to anchor on the southern side of the bay, as it is seldom free from a rolling swell, and a heavy westerly swell heaves into it at the full and change of the moon, whilst vessels anchored under the lee of Merker island are in comparatively smooth water.

At Spencer bay, northerly winds never blow with violence, otherwise this would be a dangerous bay to lie in. The bay is sheltered from the south-south-westerly winds by Südhuk, though they sometimes blow over it during violent gales.

Chart 3862.

Coast.—Rugged cliffs extend about 2½ miles southward of Südhuk, terminating in a point which, when seen from southward, is in the form of a rocky pyramid, but from westward, appears flat-topped; thence a bay, the shores of which are of sand and cliffs, extends about 2 miles in a south-south-easterly direction. At the southern end of this bay is a rather conspicuous cliffy headland, whence the coast forms another bay, about 4 miles across in a south-easterly direction, which is backed by sandhills without any distinguishing feature. *See* view on charts 3862, 632.

Saddle hill (*Lat. 25° 54′ S., Long. 14° 55′ E.*), situated about 11 miles south-south-eastward of Südhuk, is conspicuous and sharp-peaked, *see* view on charts 3862, 632. It stands immediately over the coast, and may easily be observed in clear weather, from Itshabo island, about 23 miles further southward. When seen from northward, Saddle hill has apparently but one peak, and is only distinguishable as being the highest land in the locality.

The coast between Saddle hill and Hottentot bay is a sandy beach, rising at a short distance inland to a level range of sandhills. This beach is continuous except in two places, where there are small sandy cliffs close to the coast.

Chart 3862, plan of Hottentot bay.

Hottentot bay.—Beacon.—The entrance to this bay, situated

Chart, 3862, plan of Hottentot bay.

about 14 miles southward of Saddle hill, is about 3 miles wide between Hottentot point and the mainland eastward of it.

Hottentot point is the western extremity of a peninsula protecting the bay on its south-western side, which appears as a succession of sandhills, of about equal height; it is partly rocky and cliffy, but is joined to the mainland by a low sandy neck. From southward, this peninsula appears as two low, bare, grey, isolated rocks, of which the northern one is a little the higher; from westward, it shows up well, and is visible at a distance of from 10 to 12 miles.

There is a pyramidal framework beacon, 41 feet ($12^{m}5$) in height, the summit of which is at an elevation of 116 feet ($35^{m}4$), on the higher of the two dark summits of the peninsula, *see* sketch on plan on chart **3862.**

Hottentot bay is closed territory. No natives are allowed there on account of the diamond deposits. There is an abundance of fish to be caught.

Shoals.—A shoal, the least known depth over which is 4½ fathoms ($8^{m}2$), lies about 12 miles northward of the beacon on Hottentot peninsula. There are tide rips over the shoal and between it and the peninsula; with a heavy swell, the sea breaks upon the former, as also it does half a mile northward of Hottentot point.

A shoal with a depth of 29 feet ($8^{m}8$) lies about 5 cables northward of Hottentot point, it breaks in a heavy swell.

Anchorage.—There are depths of less than 3 fathoms ($5^{m}5$) within half a mile of the shore in the south-western part of the bay, but secure anchorage, in a depth of about 4 fathoms ($7^{m}3$), good holding ground of sand and mud, may be obtained about 11 cables east-north-eastward of the beacon.

Chart 3862.

Coast.—Dangers.—From Hottentot point to Gefahr (Danger) point, about 8 miles southward, the intervening coast is generally rocky, with occasional sandy beaches. Some of the points are marked by rocks and are prolonged by sunken reefs which in certain places extend a considerable distance offshore.

Breakers extend about one cable offshore, in an unbroken line, from Hottentot point to Gefahr point.

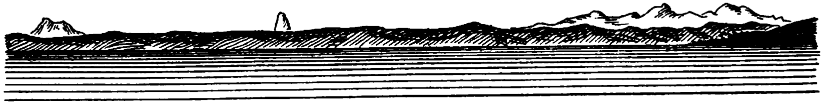
Gallovidia reef (*Lat. 26° 10′ S., Long. 14° 56′ E.*), several parts of which are awash and others above water, extends in a southerly direction, for about 1½ miles, from a point situated about 1¼ miles south-south-eastward of Hottentot point. At its southern extremity is a rocky islet, where, during the laying and incubation season, numerous birds resort. This reef lies nearly in the direct track from Hottentot bay to Douglas bay. Care should be taken to keep in a depth of not less than 9 fathoms ($16^{m}5$), as the sea has been observed to break heavily in depths of 8 fathoms ($14^{m}6$).

A shoal, over which the least depth is 5½ fathoms ($10^{m}1$), lies about 1½ miles south-south-westward of the islet at the southern end of Gallovidia reef; with a heavy swell, the sea breaks upon this shoal.

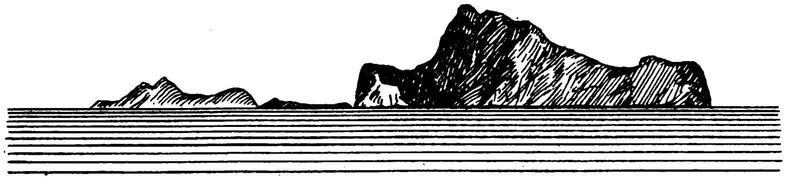
Chart 3863, plan of Douglas bay.

Gefahr point is cliffy, and a broken and cliffy coast extends south-south-westward from it for about 6 cables to Wrack huk (Wreck point), whence it continues in a south-south-easterly direction for about three-quarters of a mile to another cliffy projection situated at the

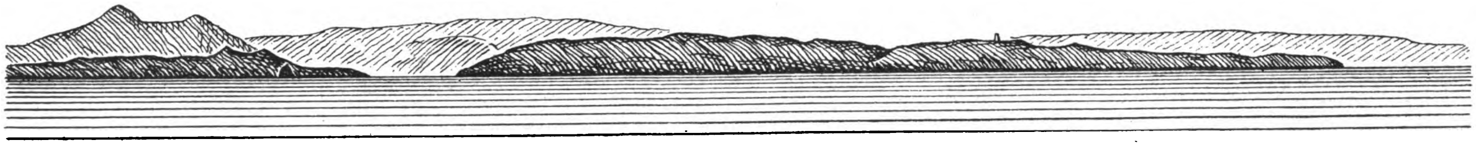
To face page 262.


Thumb-shaped mountain.
Hanoas Berg ɸ the mouth of Swakop river, bearing 062°, distant 2 miles.

Coast northward of Swakopmund.
(*Original dated* 1878.)

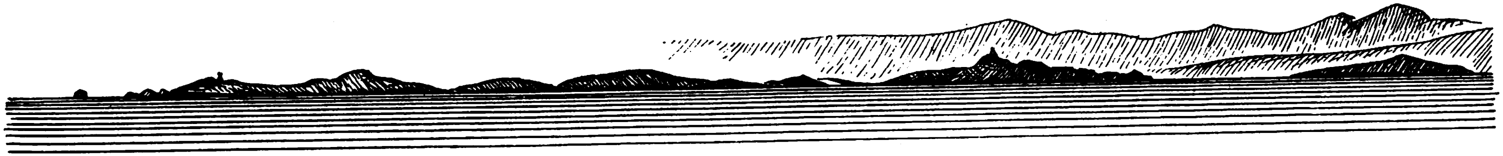


Spencer bay from northward.
(*Original dated* 1882.)


Albatross peak, bearing 035°, distant 8 miles.
Wolf bay.
North Long island. (Beacon non-existent.)

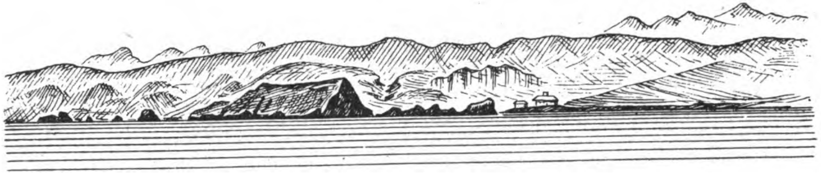
Coast in the vicinity of Wolf bay.
(*Original dated* 1912.)

To face page 263.



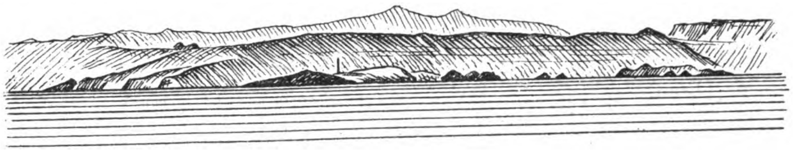
Possession island from south-westward.

(*Original dated* 1912.)



Coast in the vicinity of Albatross rocks.

(*Original dated* 1912.)


Jammer bay.
Pomona island, bearing 081°,
distant 2½ miles.

Pomona island from westward.

(*Original dated* 1912.)

Chart 3863, plan of Douglas bay.

northern end of Douglas bay. The sea breaks heavily all along this part of the coast.

Jakal beacon stands near the coast, about 4 cables northward of the last-mentioned point.

A shoal, over which the depths are less than **3** fathoms ($5^{m}5$), extends seaward for about 1¼ cables from Wrack huk; and a detached shoal, over which there is a depth of 2½ fathoms ($4^{m}6$), lies about one-quarter of a mile north-westward of the point; there is a depth of 3½ fathoms ($6^{m}4$) rock, about 3¼ cables west-south-westward of the point.

Itshabo island.—Itshabo (Ichabo) island (*Lat. 26° 17′ S., Long. 14° 56′ E.*), said to be composed of granite, slate, stone, and quartz, is situated about 7 cables south-westward of Wrack huk, and is about 30 feet ($9^{m}1$) high. On the island are, near its northern end, a settlement and a flagstaff, and on its highest part, towards its south-western extremity, a spar beacon. The settlement is the only noticeable feature, the beacon having been reported to be indistinguishable at a distance of 7 miles. From westward, the island appears to be low-lying, with a light sandy face. At its southern end is a dark hummock. *See* view on charts **3863, 632.**

Breakers and foul ground extend nearly a quarter of a mile westward of the island on which side there is an islet close-to. Sunken rocks extend northward and southward of the island for about 2 cables, and half a cable, respectively. The island should not be approached within **3** cables of its western side, or northern end, nor within 2 cables of its southern end.

There is a depth of 3½ fathoms ($6^{m}4$) about 1¾ cables north-eastward of the settlement, between which depth and the rock off Wrack huk there is a channel about 1½ cables wide in which the depths are from 5½ to 6 fathoms ($10^{m}1$ to $11^{m}0$).

Itshabo is the most valuable of the Government guano islands, *see* page 19, and is the home of a breed of gannets, which are known locally as Madagars. The guano collecting season is in April and May, when all the birds have departed; after an absence of two months, the birds suddenly reappear in one immense flight, which is said to last only one hour.

Landing will often appear difficult to a stranger; the best place is on the north-eastern side of the island, where a patch of kelp will be seen which materially assists when hauling up a boat on the shelving rocky shore.

Fish may be caught at the anchorage with hook and line, or in great quantities at the head of Douglas bay, in the seine; crayfish abound all round the island near the shore.

Douglas bay.—Douglas bay is entered between the cliffy projection, mentioned above, and Douglas point (*Lat. 26° 18′ S., Long. 14° 57′ E.*), about 9 cables south-south-westward. Breakers extend for about **3** cables northward, and one cable north-eastward and westward, of the latter point.

Rocky point, situated about 4 cables north-eastward of Douglas point, gives protection to the landing place eastward of it.

Directions.—Anchorage.—Vessels approaching between the parallels of lat. 26° 15′ S. and 26° 25′ S., should be able to make out the mountains inland, which should be steered for on a south-easterly bearing, when there should be no difficulty in making the island.

Charts 632, 1013, 2202a.

Chart 3863, plan of Douglas bay.

Vessels can pass either northward or southward of Itshabo island, giving it a berth of at least 4 cables, but the latter is preferable, as the northern passage is narrower and the sea is said to break in bad weather for several miles northward of the island.

The anchorage can hardly be considered more than fairly good, the holding ground being composed of sandy patches among rocks. Vessels can anchor, in a depth of about 5½ fathoms ($10^{m}1$), 2 cables eastward of the settlement, or in about 7 fathoms ($12^{m}8$), 3 cables east-north-eastward of the southern extremity of the island. In the first instance, vessels are well sheltered from the heavy swell which sets in, but north-eastward of the island the rollers are dangerously heavy.

Rollers come in without giving any previous warning, and it is no unusual occurrence for the approaches on either side of the island to break right across, leaving comparatively smooth water at the anchorage.

Current.—The tidal stream is imperceptible, but usually a northerly current sets through the anchorage at the rate of about one knot.

Chart 3863.

Coast.—Anchorage.—From Douglas point, the coast trends in a general south-easterly direction for about 8 miles, the last 6 miles being backed by low sandhills and small bushes.

Thence the coast trends south-eastward for about 3 miles to the northern end of Boots (Boat) bay, with a small rocky cove near its southern end.

A conical sandhill, 123 feet ($37^{m}5$) high, situated about half a mile northward of the northern end of Boots bay, is prominent, and stands out clearly when seen in the afternoon.

The entrance to Boots bay is about 2¼ miles wide, and in its southern part is an anchorage which is sheltered from southerly winds but open to those from northward and north-westward ; it is clear of dangers, and anchorage may be obtained in depths of from 4 to 6 fathoms ($7^{m}3$ to $11^{m}0$).

From the southern end of Boots bay, the coast, which is rocky, trends south-south-eastward for about 7½ miles to North-east point, the northern entrance point of Lüderitz bay.

Dagger rock is small, and lies about one cable offshore, 3 miles northward of North-east point (*Lat. 26° 35′ S., Long. 15° 09′ E.*).

Breakers fringe nearly the whole of the coast between Douglas bay and Lüderitz bay.

Off-lying dangers.—Marschall (Marshall) rocks are dangerous and extensive reefs which lie about three-quarters of a mile offshore, from about 1½ to 3½ miles southward of Douglas point. Many of these rocks, being submerged, are not seen when the sea is smooth, but breakers extend in a south-easterly direction for nearly 2 miles from the south-eastern extremity of the reef, and a bank, over which the depths are from 7 to 10 fathoms ($12^{m}8$ to $18^{m}3$), extends in the same direction for another 2 miles. There is reported to be a deep-water channel inside these rocks through which vessels have passed to the entrance to Douglas bay ; but it is highly dangerous and should never be attempted except from urgent necessity.

Staple rocks, one of which is 29 feet ($8^{m}8$) high, lie about midway between the south-eastern end of Marschall rocks and the coast ; it is probable that they are joined to the former.

Charts 632, 1013, 2202a, 2203, 2127.

Chart 3863.

Although the above dangers may be passed at a distance of less than one mile, rollers extend much further seaward, and breakers have often been seen in depths of 10 fathoms ($18^{m}3$), and even in 12 fathoms ($21^{m}9$).

The conical sandhill near the northern end of Boots bay in line with a high rounded hill inland, bearing 098°, leads southward of Marschall and Staple rocks, in depths of from 7 to 9 fathoms ($12^{m}8$ to $16^{m}5$), but this depth is too shoal for some circumstances which may arise on this coast, and to keep clear of the rollers a vessel should keep the high rounded hill well open southward of the conical hill. Anichab (Anischab) rocks (*Lat. 26° 22′ S., Long. 15° 02′ E.*) are low and break and lie about half a mile offshore, about 3½ miles south-eastward of Staple rocks.

Boots Bay rocks extend for about three-quarters of a mile, in a west-north-westerly direction, from the point at the northern end of Boots bay.

Dumfudgeon rocks are two islets, three-quarters of a mile offshore, about 2¼ miles southward of the southern entrance point of Boots bay.

Chart 3861, plan of Lüderitz bay.

LÜDERITZ BAY. — Approach. — Beacons. — This bay is entered between North-east point and Diaz point, situated about 4½ miles south-westward; within it are several fairly good anchorages which are easy of access, but they are exposed to the swell, which, being deflected by the contour of the land, enters the bay from north-westward. *See* view on charts 3863, 632.

Little Orange river flows into Lüderitz bay, but its mouth is not shown on the plan on chart 3861.

North-east point (*Lat. 26° 35′ S., Long. 15° 09′ E.*) is bold and rocky. North reef extends from it in a south-south-westerly direction for about one-quarter of a mile.

Diaz point is the northern extremity of a rocky peninsula, and has a depth of 5 fathoms ($9^{m}1$) close northward of it; but a shoal, over which the depth is 4½ fathoms ($8^{m}2$), extends about one-quarter of a mile from the coast between Diaz point and the north-western extremity of the peninsula.

Angra point, situated about 2 miles east-north-eastward of Diaz point, is about 125 feet ($38^{m}1$) high.

Angra point beacon, consisting of a white tripod with a framework topmark, about 30 feet ($9^{m}1$) in height, stands on the 125 foot ($38^{m}1$) summit southward of Angra point.

Two beacons are situated about a cable east-north-eastward, and one and a quarter cables east-south-eastward, respectively, of Angra point beacon; each is a triangular beacon on a white base, 10 feet ($3^{m}0$) in height.

Stürmvogel bucht (Shearwater bay) is entered between Diaz and Angra points, and in it landing can be effected at three places. On the south-eastern shore of the bay at Rhennin's cove is a disused whaling station, with many large buildings and several tall chimneys.

Angra rock, which is above water, lies about 2 cables northward of Angra point. The sea breaks between the rock and the point, and a reef extends about one-quarter of a mile northward from the former.

Charts 632, 1013, 2202a, 2203, 2127.

Chart 3861, plan of Lüderitz bay.

This rock and reef are covered by the *red* sector of the auxiliary light on Diaz point between the bearings of 230° and 290°, and the *green* sector of Hai Fisch (Shark) Island light between the bearings of 039° and 136°.

Lüderitz harbour is a narrow inlet, eastward of Angra point, but only the outer part is available as an anchorage.

Griffith bay is a small indentation on the western side of Lüderitz harbour, and Redford bay is a large indentation, about 2½ cables wide, with depths of less than 3 feet (0^m9), on the eastern side of the harbour, southward of the settlement.

Two radio masts on the eastern side of Lüderitz harbour about 11 cables southward of Hai Fisch Island light are prominent and it is reported that the German church spire in line with a prominent water tower, about 4 cables north-north-eastward of the radio masts, is of assistance when approaching the anchorage in Lüderitz harbour.

Light.—Fog signal.—Beacon.—A light is exhibited, at an elevation of 174 feet (53^m0), from a white circular tower with a red band, situated on the promontory, about 3 cables southward of Diaz point (*Lat. 26° 38′ S., Long. 15° 06′ E.*). As an example of the abnormal refractions experienced on this coast, it may be mentioned that, at 2230 on November 2nd, 1915, Diaz Point light was seen distinctly at a distance of 90 miles.

A fog signal is made from a conspicuous square stone building, situated on the promontory, about one-quarter of a mile north-westward of the lighthouse.

Near the fog-signal station is a beacon, consisting of a marble cross, which marks the site of a similar cross erected by Bartholemeu Diaz, in 1486; this beacon is difficult to distinguish, being dwarfed by the fog-signal station.

There is a signal mast situated close northward of the lighthouse and a small jetty on the beach eastward of the lighthouse.

Whistle-buoy.—A whistle-buoy, painted white, surmounted by two triangles, points upward, is moored about 5½ cables north-north-westward of Angra rock, off the northern extremity of the reef extending from Angra point; the buoy is fitted with reflectors.

The buoy is withdrawn periodically for overhaul and is replaced by a black conical buoy without a whistle.

Islands.—Reefs.—Buoy.—Seal, Penguin and Hai Fisch islands lie off the eastern side of Lüderitz bay, in that order, from north to south, and are each connected to the mainland by banks over which the depths are less than 3 fathoms (5^m5).

Flamingo island, which is in reality a small peninsula projecting southward from the northern shore of Lüderitz bay, is situated about half a mile eastward of North-east point.

Seal island is situated about half a mile south-westward of Flamingo island, and is about 138 feet (42^m1) high. It is round-topped, of a dark colour, and its northern end slopes more gradually than does its southern end, of which latter a shoal, with depths of less than 6 fathoms (11^m0), extends about 2½ cables in the direction of Penguin island. There is a landing place on the north-eastern side of the island.

North harbour is entered between Flamingo and Seal islands.

Penguin island (*Lat. 26° 37′ S., Long. 15° 09′ E.*) is situated about 6 cables southward of Seal island, and is about 158 feet (48^m1) high,

Charts 3863, 632, 1013, 2202a, 2203, 2127.

Chart 3861, plan of Lüderitz bay.

and rocky. A reef extends about one cable from its south-western side, and a reef with breakers extends from its northern end. The reef off the south-western side of Penguin island is covered by the *red* sector of Hai Fisch Island light between the bearings of 161° and 180°. Seal and Penguin islands are Government guano islands, *see* page 19.

The actual channel between Seal and Penguin islands, in which the depth is about 6 fathoms ($11^{m}0$), is narrowed by the reefs mentioned above, to about one cable. It leads into a basin in the southern part of which is Tiger reef. This reef, which is awash, lies between the northern end of Penguin island and the mainland eastward; a black conical buoy is moored on the north-eastern side of the reef.

Hai Fisch island, the southernmost of the three islands, is situated about half a mile southward of Penguin island, and is 138 feet ($42^{m}1$) high. Its southern end is joined to the mainland by a causeway, and off its northern point, a reef over which there is a depth of 3 feet ($0^{m}9$) extends about one cable in a northerly direction.

Lights.—A light is exhibited, at an elevation of 122 feet ($37^{m}2$), from the flat top of a yellow, square tower 11 feet ($3^{m}4$) in height, situated near the centre of Hai Fisch island (*Lat. 26° 38′ S., Long. 15° 09′ E.*).

A light is exhibited, at an elevation of 16 feet ($4^{m}9$), from a conical structure on the head of a pier at a cannery on the eastern side of Robert harbour, about 11 cables north-north-eastward of Hai Fisch Island lighthouse.

A light is exhibited at the head of each of the piers at Lüderitz.

Buoyage.—A light and bell buoy, painted red and white, and exhibiting a *white flashing* light *every three seconds*, is moored on the southern side of the channel between Penguin and Hai Fisch islands, about 1¾ cables northward of the northern extremity of the latter.

At the beginning of January and July the light-and-bell-buoy is withdrawn for overhaul and replaced by an unlighted black conical buoy without a bell.

Two black spar buoys are moored on the northern side of the channel between Penguin and Hai Fisch islands, about 1½ cables south-south-westward, and 2¼ cables south-westward, respectively, of the southern extremity of Penguin island.

Robert harbour.—Beacons.—This harbour is a good and fairly sheltered anchorage, which is entered between Penguin and Hai Fisch islands. The southern part of the harbour, between Hai Fisch island and the mainland is shallow, and is known as Menai creek, at the head of which is the town of Lüderitz.

Leading beacons, about three-quarters of a cable apart, are situated on the mainland about 6 cables eastward of the northern extremity of Hai Fisch island. Each is a triangular wooden beacon, painted in black and white chequers 10 feet ($3^{m}0$) in height. The beacons in line, bearing 118°, lead through the entrance of Robert harbour.

A white beacon (*Lat. 26° 37′ S., Long. 15° 10′ E.*), consisting of a spar surmounted by a white ball, 26 feet ($7^{m}9$) in height, stands on the summit of Nautilus hill, which is 427 feet ($103^{m}1$) high and is situated on the mainland about 7 cables eastward of the southern end of Penguin island; it appears to be the highest land in this neighbourhood.

Charts 3863, 632, 1013, 2202a, 2203, 2127.

Chart 3861, plan of Lüderitz bay.

Directions.—No difficulty should be experienced in entering Lüderitz bay. Diaz point can be rounded at a distance of 3 or 4 cables but, from whatever direction the approach is made, vessels should pass northward of the whistle-buoy off Angra rock. From the whistle-buoy a course can be shaped for the entrance to Robert harbour, or for the anchorage in Lüderitz harbour.

At night, by keeping in the *white* sector of Hai Fisch island light between the bearings of 136° and 161°, Angra rock and the reef off Penguin island will be cleared.

Anchorages.—The following anchorages in Lüderitz bay are available. In some parts of the bay the bottom is reported to be a layer of ooze 10 to 13 feet (3^{m}0 to 4^{m}0) thick, over rock, making the holding insecure, but it is uniformly good between Angra point and Hai Fisch island.

In Lüderitz harbour there is anchorage in depths of 35 feet (10^{m}7), with Hai Fisch island light bearing about 136° and Angra Point beacon bearing about 266° ; also in a depth of about 3½ fathoms (6^{m}4), about half a mile north-westward of the settlement.

If proceeding to the anchorage in Lüderitz harbour, after passing the whistle-buoy, steer to pass about 5 cables north-eastward of Angra point, and, when Angra point beacon is in line with the beacon east-north-eastward of it, bearing 246°, steer about 170°, and anchor when Angra point is in line with the beacon east-south-eastward of it, bearing 290°.

North harbour has fair anchorage in a depth of about 3¾ fathoms (6^{m}9).

Vessels of light draught might anchor under the lee of Seal island, on the bank joining that island to the mainland.

In Robert harbour the holding ground is poor in places, and vessels have dragged there, but a berth reported to be safe for vessels drawing up to 24 feet (7^{m}3), with a swinging radius of 2 cables, is on the line of the leading beacons, with Hai Fisch Island lighthouse (*Lat. 26° 38′ S., Long. 15° 09′ E.*), bearing 214°, distant about 4¾ cables ; there is good holding ground of clay, but a considerable north-westerly swell is felt at times.

Anchorage in Robert harbour may also be obtained with the light on the western pier of Lüderitz in line with the church south-south-westward of it, bearing about 196°, distant 7 or 12 cables.

H.M.S. *Verbena*, in 1924, anchored 4½ cables, 045° from Hai Fisch Island lighthouse, with good holding ground.

With a swell setting into the bay, anchorage in the northern end of Robert harbour is recommended.

In Stürmvogel bucht, anchorage can be obtained in depths of from 3 to 6 fathoms (5^{m}5 to 11^{m}0), according to draught, on a sandy bottom, with good shelter from all except northerly and north-westerly winds ; it is subject, however, to violent gusts and squalls.

Pilots.—A pilot may be obtained by making the usual signal.

Lüderitz.—This settlement owes its prosperity as a seaport to the discovery, in the year 1908, of diamonds in the adjacent districts of Kolmanskop and Pomona. It is situated on the mainland, on the point southward of Hai Fisch island, between Menai creek and Lüderitz harbour.

In addition to diamonds the port is now intensely active with the

Charts 3863, 632, 1013, 2202a, 2203, 2127.

Chart 3861, plan of Lüderitz bay.

canning industry. There are four canneries which process and can all types of fish and craw-fish, and produce fish-meal, fish and seal oils and seal skins.

There is a hospital situated on Hai Fisch island. In 1951, there was a population of 3,250, of whom 1,200 were Europeans.

Port facilities.—There are two piers at the head of Menai creek. There is 11 feet ($3^{m}4$) of water alongside both sides of the west jetty, and on the western side of the eastern jetty; the eastern side of eastern jetty has only 8 feet ($2^{m}4$). The eastern jetty has no facilities and is only used by fishing craft and small boats.

The western or concrete jetty is used by light craft and coasters, and is provided with two 4-ton electric cranes. Fresh water is laid on. There is a steam crane which can lift 7 tons at minimum radius.

One tug and 10 lighters are available.

About 200 tons of coal are kept in stock and can be supplied to vessels at anchor at a rate of 10 tons per hour.

Very small quantities of fuel oil and diesel oil are available. Water can be supplied.

Meat and bread are obtainable, but vegetables are scarce.

Repairs can only be executed on a small scale.

There is a slipway for the use of tugs and lighters, with a dead weight capacity of 250 tons, on the eastern side of Hai Fisch island (*Lat. 26° 38′ S., Long. 15° 09′ E.*).

Communications.—There is occasional sea communication between Lüderitz and Cape Town.

Lüderitz is connected to the railway system of the union of South Africa; it is also connected with the general telegraph and telephone systems.

Life-saving.—A line-throwing apparatus is maintained.

Shipping.—In 1949-50, a total of 137 vessels, with an aggregate gross tonnage of 232,278 tons, called at Lüderitz.

DIAZ POINT TO ORANGE RIVER.—Coast.—Guano bay, situated immediately westward of Diaz point, is sheltered from southerly and south-westerly winds, but open to northerly winds.

Halifax island (*Lat. 26° 39′ S., Long. 15° 05′ E.*), close off the western entrance point of Guano bay, is about 122 feet ($37^{m}2$) high; on it there are some huts, and at its north-eastern extremity a flagstaff. It is one of the Government guano islands, *see* page 19. Seen from southward, it appears as a range of black hummocks, and has been mistaken for Diaz point. The island is separated from the mainland by a narrow channel. Halifax reef, portions of which are above water, extends in a north-north-westerly direction, for about 5 cables, from the island.

Anchorage.—Anchorage may be obtained in Guano bay, in a depth of about 5 fathoms ($9^{m}1$), about 3 cables north-eastward of the flagstaff on Halifax island; but within this distance of the shore the depths decrease rapidly.

Chart 3863.

Coast.—Anchorage.—From Halifax island the coast, which is rocky, trends southward for about 5½ miles to the northern entrance point of Grosse (Big) bay.

Charts 3863, 632, 1013, 2202a, 2203, 2127.

Chart 3861, plan of Grosse bay.

The entrance to Grosse bay is about 1½ miles wide, and has a sandy coast-line alternating with rocks; it affords no shelter and the bottom within it is foul.

Chart 3863.

Albatross peak is a double-headed hill, about 591 feet ($180^{m}1$) high, and is reddish in colour, forming a good mark from southward; it is situated about 2¾ miles eastward of Grosse bay, *see* view facing page 262.

From the southern entrance point of Grosse bay, the coast, which is rocky, trends south-south-eastward for about 3½ miles to Wolf bay, the entrance to which is about one-quarter of a mile wide. *See* view facing page 262. The shores of the bay are sandy, but the bay is exposed to south-westerly winds and offers no protection; there is, however, a landing place on a small sandy beach at its head.

North and South Long islands are Government guano islands, *see* page 19. North Long island lies about 5 cables offshore close southward of the entrance to Wolf bay; it is a low level island, and is almost divided into two parts. South Long island, situated about half a mile southward of North Long island, lies about 1½ cables off a small point on the mainland.

There is an anchorage, affording good shelter, behind North Long island, which is used by small craft with local knowledge. Landing is dangerous during strong southerly winds.

From the point abreast South Long island, the coast trends in a south-south-easterly direction for about 2 miles to Zwei Spitz (*Lat. 26° 51' S., Long. 15° 09' E.*), which is the northern entrance point of a bay about 5 cables wide, the depths in which are uncharted. From Zwei Spitz the coast runs southward for about 3 miles and thence east-south-eastward for about 2 miles to Elizabeth point. This part of the coast is much indented, rocks extend off it in many places, and the surf is heavy. There are slight signs of vegetation. A submerged reef lies about 4 cables from the coast, 1½ miles southward of Zwei Spitz.

Elizabeth bay.—Elizabeth point (*Lat. 26° 55' S., Long. 15° 11' E.*) is the northern entrance point of Elizabeth bay, and is low and rocky, with a dangerous reef and heavy breakers extending some distance southward from it. On the point are some large buildings, which are remarkable from seaward; northward of these buildings there is a settlement.

The lights of the electric power station on Elizabeth point are of assistance to vessels approaching Lüderitz bay at night.

The entrance to Elizabeth bay is about 4 miles wide between Elizabeth point and the reefs extending northward of Possession island. Eastward of Elizabeth point the shore is sandy, but on the eastern side of the bay rocks alternate with sandy beaches. Landing may be effected, in fine weather, in the southern part of the bay. The bay is backed by a low plain with shifting sandhills, behind which the country is hilly.

Zweikuppen, or Saddle mount, 1,170 feet ($356^{m}6$) high, is situated about 7¾ miles eastward of Elizabeth point; Dreizack berg, 1,524 feet ($464^{m}5$) high, rises about 6½ miles south-eastward of Zweikuppen. Behind these hills are two remarkable peaks, named The Paps, which in clear weather are very conspicuous; when in line they bear about 053°.

Charts 632, 1013, 2202a, 2203, 2127.

Chart 3863.

The settlement at Elizabeth bay is connected to the railway system of the Union of South Africa.

Chart 3863, plan of Possession road.

Possession road. — Beacon. — This roadstead lies between Possession island and the mainland.

Possession island is situated about 4½ miles southward of Elizabeth point, and about 2 miles offshore. It is about 37 feet (11^{m}3) high at its northern end, and 67 feet (20^{m}4) at its southern end. The coasts of the island are rocky and nearly perpendicular. When seen from a short distance southward, it appears as a group of islets, for it has three or four summits joined by low land, *see* view facing page 263. A beacon is situated on the northern summit. The island is easily identified when approached either from northward or southward.

It is one of the Government guano islands, *see* page 19.

There is a small settlement, in connection with the collection of guano, on the eastern side of the island, about half a mile from its northern extremity. At the settlement there is a flagstaff and a small pier. Water is obtained from sun-condensers, and a small quantity might be available for shipping. Fish of excellent quality may be caught in great quantities near the shore.

Dangers.—Buoy.—At the northern end of Possession island (*Lat. 27° 00′ S., Long. 15° 11′ E.*) there are three islets, from the northern of which North reef, which is submerged and marked by breakers, extends northward for over half a mile.

Kreuz shoals are in two groups, one of which, with a least depth of 2 fathoms (3^{m}7) over it, lies about 13 cables north-eastward of the northern end of Possession island; the other group extends northward for about half a mile from a position about 6½ cables north-eastward of the northern extremity of Possession island, and has a depth over its southern head of 1½ fathoms (2^{m}7), the remaining depths being not less than 4 fathoms (7^{m}3).

Possession rock, over which there is a depth of 3 feet (0^{m}9), lies about 6½ cables south-eastward of the northern extremity of Possession island, and about one-quarter of a mile from its eastern shore. It is marked by a red cask buoy.

South reef is the rocky and foul ground that extends about 1½ miles southward from the southern extremity of Possession island.

Directions.—Anchorage.—As these directions were written prior to 1909 vessels should exercise caution. The southern channel is the best by which to approach the anchorage in Possession road; but should it be necessary to use the northern channel, it is best to keep well over towards the mainland, being careful to avoid the reef off Elizabeth point. To avoid the shoals extending from them, the islets off the northern end of Possession island should be given a berth of at least one mile, by bearings of the junction of the sand and rock at the northern end of the sandy beach on the mainland abreast the northern end of the island. When the flagstaff is open southward of the northern shed at the settlement, bearing 210°, the anchorage may be steered for, but this leads between the 9 and 12-foot (2^{m}7 and 3^{m}7) patches of the Kreuz shoals. From the chart, it would appear that a better approach would be between the 12-foot (3^{m}7) patch and the mainland; after clearing the patch the anchorage could be approached with the flagstaff at the settlement bearing about 225°.

Charts 632, 1013, 2202a, 2203, 2127.

Chart 3863, plan of Possession road.

Approaching the road from southward, the southern point of Possession island should be given a berth of at least 1½ miles until the northern extremity of that island opens eastward of its south-eastern point; the anchorage may then be steered for, care being taken to pass eastward of the buoy marking Possession rock.

Good anchorage, in smooth water, may be obtained on the eastern side of Possession island, in depths of from 4 to 5 fathoms ($7^{m}3$ to $9^{m}1$), at about half a mile north-north-eastward of the flagstaff at the settlement.

Boats can land at the settlement in all weathers; in other parts of the island landing is difficult. On the mainland the best position at which to effect a landing is at the southern end of the long sandy beach opposite the settlement, but advice should be obtained locally before the attempt is made.

Charts 3863, 3864.

Coast.—From the point on the mainland abreast the southern end of Possession island (*Lat. 27° 02′ S., Long. 15° 14′ E.*) the coast trends in a southerly direction for about 1¾ miles to the north-western point of a small indentation, about one-quarter of a mile across, off which rocks extend southward for about half a mile. Thence the coast, off which there are several rocks, curves south-eastward for about 2 miles to the northern end of Prinzen bay.

Chart 3861, plan of Prince of Wales bay.

Prinzen bay.—Prinzen (Prince of Wales) bay is formed by a small indentation in the coast, off the south-western point of which a group of islets extends in a northerly direction, and is surrounded by rocks awash and foul ground. This point is situated 5½ miles south-south-eastward of the southern extremity of Possession island.

This small settlement is connected by tramline with Lüderitz.

Danger.—Buoy.—The s.s. *Ingerid*, drawing about 12 feet ($3^{m}7$), reported, in 1910, that she struck a rock in about the position of the rock with a depth of less than 6 feet ($1^{m}8$) over it, the position of which is doubtful, indicated on the chart about 4½ cables north-westward of the northern of the above islets.

A white spar buoy, surmounted by two cones, points up, is moored in the northern approach to Prinzen bay.

Directions.—Anchorage.—A beacon, on the eastern side of the bay, in line with a sandhill, bearing about 131°, leads close southward of the buoy, into the bay. When a flagstaff, on the foreshore south-westward of the beacon, is in line with a house, bearing about 151°, course should be altered for the anchorage.

Good anchorage for small vessels may be obtained, in a depth of from 4 to 6 fathoms ($7^{m}3$ to $11^{m}0$), on the leading line of the flagstaff and house, with Mangel beacon, situated about one-quarter of a mile further south-westward, in line with Lower Entrance beacon, bearing about 174°. *See* view on plan on chart 3861.

Landings may be effected on a very shelving sandy beach.

Albatross rocks.—A group of islets and rocks of volcanic formation, extending about 6½ cables in a northerly and southerly direction, lies off the coast about three-quarters of a mile south-westward of Mangel beacon (*Lat. 27° 07′ S., Long. 15° 15′ E.*). The southernmost and largest islet is prominent from westward. *See* page 19 and view facing page 263.

Charts 632, 1013, 2202a, 2203, 2127.

Chart 3861, plan of Prince of Wales bay.

A shoal extends about 4 cables northward from the northernmost rock, the least depth, at its extremity, being 3¾ fathoms (6^{m}9); foul ground and breakers extend about 1½ miles southward from the largest rock, and the ridge on which they are terminates about 1¼ miles further southward in a depth of 8½ fathoms (15^{m}5).

In the centre of Albatross channel, between the rocks and the mainland, there are depths of from 11 to 16 fathoms (20^{m}1 to 29^{m}3).

Chart 3864.

Coast.—From the south-western entrance point of Prinzen bay, the coast trends southward for about 3½ miles to the northern entrance point of Jammer bay, and is fringed with rocks and breakers.

The entrance to Jammer bay is about half a mile wide.

From the southern point of Jammer bay, the rocky coast trends south-south-westward for about 1¼ miles to a point off which lies Pomona island. Landing can be effected near this point.

The hills forming the coastal range between Prinzen bay and the point abreast Pomona island are from about 150 to 450 feet (45^{m}7 to 127^{m}2) high.

Pomona island.—Beacon.—Anchorage.—This island, which is one of the Government guano islands, *see* page 19, is about 51 feet (15^{m}5) high, and is situated close offshore. On the eastern side of the island are a flagstaff and a beacon surmounted by a cross. When seen from westward the island appears as two low-lying hummocks. *See* view facing page 263. Vessels may anchor off its northern end in depths of from 5 to 6 fathoms (9^{m}1 to 11^{m}0), good holding ground.

There is a submerged rock in the narrow channel between the island and the mainland.

Coast.—From the point abreast Pomona island, the coast trends southward for about 8¼ miles to Black point (*Lat. 27° 19′ S., Long. 15° 18′ E.*), and then south-south-eastward for 24 miles to Löwenkopf (Lion's head) (*Lat. 27° 40′ S., Long. 15° 31′ E.*).

The whole of this coast is most desolate in appearance, and without the least sign of vegetation.

The coast is fringed with numerous islets and reefs, which lie within a distance of about half a mile offshore; but there are no known dangers beyond the distance of one mile offshore.

Nose point is the southern entrance point of a slight indentation, about 1¾ miles wide, immediately south-south-eastward of Black point.

Black rock (*Lat. 27° 24′ S., Long. 15° 21′ E.*), which is occasionally frequented by a few fur seal, lies close southward of Square point, the northern entrance point of Van Reenen bay, and situated 4¾ miles south-south-eastward of Black point.

Van Reenan bay, which is entered between Square point and a point, close over which is Black knoll, about one mile south-eastward, is merely another slight indentation in the coast, and apparently affords no shelter, though there is no information regarding its possibilities as an anchorage.

The whole of the coast in this neighbourhood is a sandy desert, with the exception of a few rocky hills of volcanic formation.

Bogenfels, or Arch rock, situated about 5 miles south-south-eastward of Square point, is a large rock on the coast, which seems to have been of some extent; the action of the sea, or some other cause, has carried away its centre, excepting a surface about 20 feet (6^{m}1) deep,

Chart 3864.

which rests on the two extremities, forming an archway about 100 feet ($30^{m}5$) high. From north-westward or westward this arch is not at all distinct, but it shows up well against the light-coloured coast when bearing about 010°.

Dreimaster ridge and Dreimaster huk (point), the northern and southern entrance points of the bay of the same name, are situated about 5¾ and 7¼ miles, respectively, south-south-eastward of Bogenfels. The shore of the bay is foul and breakers extend about one-quarter of a mile off it.

False Plum Pudding is a rocky projection situated about 3 miles south-eastward of Dreimaster huk; much foul ground is indicated on the chart extending about one mile off it.

Plum Pudding islet is small, and lies 3 cables offshore, about 2 miles south-eastward of False Plum Pudding. It is one of the Government guano islands, *see* page 19 and view facing page 282.

Black Sophie is a rock, at the northern end of Baker bay, lying about 4 cables southward of Plum Pudding islet. Foul ground and breakers surround both these islets, and extend to the coast.

Baker bay is entered between Black Sophie rock and Sinclair island, situated about 9 cables southward. Sinclair island is one of the Government guano islands, *see* page 19, and is almost joined to the mainland at Löwenkopf, the southern entrance point of Baker bay. The depths in the bay decrease from 8 to 4 fathoms ($14^{m}6$ to $7^{m}3$), sand, the latter depth being found outside the breakers, at about 3 cables offshore. The bay affords tolerable shelter with southerly winds. Angras Juntas police station and flagstaff are at the head of the bay, southward of which is the landing place.

Anchorages.—Anchorage may be obtained by vessels with local knowledge off Black rock in fine weather. The landing on the southern side of Van Reenen bay is good.

Anchorage is indicated on the chart, in a depth of about 6 fathoms ($11^{m}0$), in the southern part of Dreimaster bay, and there are landing places within its entrance points.

Anchorage is indicated on the chart in a depth of about 6½ fathoms ($11^{m}9$), in the centre of Baker bay.

Coast.—Sparrow Hawk islet (*Lat. 27° 40′ S., Long. 15° 31′ E.*) is situated close offshore in the centre of a small bay between Löwenkopf and Needle point, which is situated about half a mile southward and is about 110 feet ($33^{m}5$) high.

Durnburg bay is entered between a point about half a mile southward of Needle point, and on which is Vohsen berg (mount), and Cape Durnburg, about 1½ miles further southward. The bay appears to be full of breakers, and there are several rocks or islets in it, of which the Little Roastbeef islets are the central ones.

Dunkle Wand spitze is situated about 2½ miles south-south-eastward of Cape Durnburg, and is fringed with breakers. The coast on either side of it appears to be sandy and there is an islet in the indentation close northward of it.

About 2½ miles south-eastward of Dunkle Wand spitze a green precipice is indicated on the chart, but it is not known if it is conspicuous.

Nordfels (North rock) is one of a group lying about one-quarter of a mile offshore, about 4 miles south-eastward of Dunkle Wand spitze.

Charts 632, 1013, 2202a, 2203, 2127.

Chart 3864.

Südfels (South rock) (*Lat. 27° 50′ S., Long. 15° 38′ E.*) is one of another group lying close offshore, about 2½ miles further south-eastward. During the months of November and December, 1913, two unsuccessful attempts were made to land at Südfels. The current was found to be particularly strong inshore, and the wind was boisterous in the extreme. It is considered that landing could not be effected even in fine weather.

Chameis head is situated about 3 miles south-eastward of Südfels.

Panther huk, the southern entrance point of Chameis bay is situated about 3½ miles south-south-eastward of Chameis head.

Dangers.—Chameis reefs lie in the approach to Chameis bay.

A bank, on which the depth is 9½ fathoms (17^{m}4), extends in a south-westerly direction for about half a mile from a position about the same distance westward of Chameis head.

North reef, which breaks and has a least depth of 26 feet (7^{m}9) over it, lies about 1¾ miles south-westward of Chameis head.

South reef, with a least depth of 46 feet (14^{m}0) over it, extends from a position about one mile south-eastward of the centre of North reef to about 1½ miles west-north-westward of Panther huk.

Panther reef dries 2 feet (0^{m}6), and lies in the centre of Chameis bay about three-quarters of a mile northward of Panther huk.

The reef is surrounded by depths of from 6 to 8 fathoms (11^{m}0 to 14^{m}6).

Chart 632.

Coast.—Aspect.—Buchu Berge, which rise to elevations of over 1,640 feet (500^{m}0), are situated about 12 miles eastward of Panther huk.

From Panther huk the coast trends south-eastward in an almost unbroken line for about 60 miles to the mouth of Orange river (*Lat. 28° 39′ S., Long. 16° 28′ E.*).

The coast northward of Orange river extends as an undulating sandy plateau upon which there are no conspicuous objects, until at a distance of about 25 miles northward of the mouth of the river the land in the vicinity of the coast becomes somewhat lower; on easterly bearings a flat-topped range is seen above the lower land, and at a considerable distance north-eastward, a much higher range shows up, the summit of which is well defined. This dip in the land on the coast has the appearance of a river bed, and the southern rise, when bearing more than 090°, appears to terminate in a step, with a patch of sand below it, which tends to make it more conspicuous when seen in the afternoon. The summits of the flat-topped range behind apparently consist of bare sand, which makes them also show up clearly in the afternoon.

Northward of this, the coast resumes its monotonous appearance for a few miles, when a break is seen north-north-eastward, where the land, after maintaining nearly the same elevation for some distance, becomes lower, and slopes with three slight steps to an apparent point. These steps, on a nearer approach, are seen to be sandhills, some of which are flat-topped, while others rise to sharp peaks; these hills are more conspicuous when seen from southward than from northward, for in the latter case the sharp peaks, being lower than the land behind them, do not show up clearly, though the vicinity of a high summit inland will serve to point out their positions.

Charts 1013, 2202a, 2203, 2127.

CHAPTER VIII

ORANGE RIVER TO CAPE HANGKLIP

CLIMATE AND WEATHER.—*See* page 57.

Chart 897.

ORANGE RIVER.—This river, the native name of which is the Gariep, is one of the most considerable in South Africa, and, rising on the borders of Basutoland and Natal, traverses nearly the whole continent from east to west. It drains by far the largest catchment in the Union of South Africa, and the fact that its mouth is closed for months at a time is a comment on the paucity of the rainfall. The land at the mouth of the river is low, and good pasture is found on its northern side, but hills of up to about 600 feet ($182^{m}9$) in height begin to rise close to the coast on the southern side of the river, increasing gradually in height to Stinkfontein Berge, situated about 33 miles inland and containing peaks of over 4,000 feet ($1,219^{m}2$) in height. *See* view on chart 897.

The mouth of Orange river (*Lat. 28° 39′ S., Long. 16° 28′ E.*) is barred by extensive sandbanks, based on a rocky plateau which extends about 6 miles offshore. The breadth of its entrance is only about 175 yards ($160^{m}0$), and the sea breaks right across it. Landing is impracticable at all seasons of the year, and the nearest good landing place is at Homewood harbour, situated about 8½ miles south-eastward.

Within its entrance, the river is over one mile wide, but it is full of reedy islets abounding in wild fowl, and is only navigable by small craft; in the dry season shoals and sandbanks are everywhere visible in its channel.

At a distance of about 50 miles off the mouth of Orange river, large quantities of seaweed have been observed, and the colour of the seas has been noticed to change from deep blue to a light green. The current set up by prolonged northerly winds forces much of the seaweed into Alexander bay, *see* page 277, and on to the coast northward of the mouth of the river, *see* page 275.

Beacon.—A beacon, erected for surveying purposes, stands on the northern side of the entrance to Orange river, and forms a useful landmark. It is 53 feet ($16^{m}2$) in height, and the summit of its triangular topmark is at an elevation of 71 feet ($21^{m}6$).

Charts 896, 897.

ORANGE RIVER TO PORT NOLLOTH.—Coast.—General remarks.—Along the coast between Orange river entrance and Cape

Charts 578, 1013, 2202a, 2203, 2127.

Charts 896, 897.

St. Martin (*Lat. 32° 43′ S., Long. 17° 55′ E.*), *see* page 290, fogs of great density are frequently experienced; as the depths cannot always be relied upon to indicate the proximity of the coast, it is necessary to keep a good offing during their continuance.

In concluding his report in 1854, Commander Nolloth makes the following observations on the conditions then reigning off the coast between the Orange river and the mouth of Spoeg river, situated about 120 miles southward:—

"Although the *Frolic's* visit to the coast in about the finest time of the year (November and December) may have afforded us but little experience of its general character, yet, as it is considered to be frequently unsafe at all seasons, it may be stated that during our two months' absence we have only experienced a close-reefed topsail-breeze for a few hours on two occasions, and that the land has never been a lee shore except in a light westerly wind of short duration.

"Although we have had a considerable portion of foggy weather, which is said to be most common at this season, it has been accompanied by calms or light winds, which has enabled us to anchor, or to put the ship's head off the shore. We met no irregular currents, excepting in the vicinity of the Orange river; and with regard to rollers, which are said to be of frequent occurrence at all times of the year, and which must be very dangerous to vessels in the small open bays, or anchored in bad holding ground near the shore, our negative experience is satisfactory, as we have seen no rollers properly so called.

"Generally, excepting near the latitude of Peacock roadstead, we found rocky bottom inside of 30 fathoms (54^{m}9), and beyond this a gradually increasing depth, with a tenacious green mud, to about 80 fathoms (146^{m}3), at 15 or 16 miles from the shore."

Chart 897.

Orange river to Homewood harbour.—Alexander bay is situated about 2½ miles south-eastward of the entrance to the Orange river, and the intervening coast is low and sandy. The bay is about 3 cables wide, and has a shingle beach at its head; the bottom is rocky and uneven, but, some protection being afforded by a low reef of rocks extending from its southern entrance point, the bay is said to be quite safe for small barges. A long sunken reef, on which rollers sometimes break heavily, extends in a westerly direction for nearly one mile from the northern entrance point of the bay.

It would be imprudent to anchor off Alexander bay as few soundings have been taken and the coast is exposed. There is occasionally such a strong southerly set out of the Orange river that a vessel at anchor off the bay will swing to it even with southerly winds; it is easily detected by the discoloration of the sea.

There is a searchlight on the State alluvial diggings at Alexander bay in a position about 3½ miles eastward of Orange River beacon.

Cape Voltas (*Lat. 28° 42′ S., Long. 16° 32′ E.*) is situated about 2½ miles south-eastward of the entrance to Alexander bay, and the intervening coast is low, sandy, and desolate, but the cape is a high, bluff point, with several rocks lying about half a mile westward of it; beyond this distance there are no dangers. On the northern side of the cape there is a slight indentation in which anchorage is unsafe, as the bottom is foul and it is exposed to heavy westerly rollers at all seasons of the year.

Charts 578, 1013, 2202a, 2203, 2127.

Chart 897.

Southward of Cape Voltas, the coast forms a bay, about 3¼ miles wide, in which is Peacock roadstead. The shore of this bay is backed by hills, the sides of which are covered with grass, though the summits indicate their volcanic origin. Further inland the country is mountainous.

The depths offshore between Alexander bay and Peacock roadstead are apparently regular, increasing from 3 to 4 fathoms ($5^{m}5$ to $7^{m}3$), at about 1½ cables from the coast, to 15 and 16 fathoms ($27^{m}4$ and $29^{m}3$), at about 2 miles offshore, the bottom being sandy mud with the addition of small shells at the greater depths, where there are also indications of rocky patches.

Peacock roadstead may be easily identified by two very remarkable rocky hills, called Buchu Twins, 403 and 520 feet ($122^{m}8$ and $158^{m}5$) high, respectively, which rise abruptly from the level ground close within the southern entrance point of the bay; they appear as two long ridges, running nearly at right angles to one another, the northernmost lying in a northerly and southerly direction, *see* view facing page 283.

The shore in the southern part of the bay is a sloping rocky cliff which shelters a considerable area from the constant ocean swell, and from the south-south-westerly winds which blow during a great part of the year. Northward of the cliffs there is a long sandy beach.

The depths in Peacock roadstead are said to be regular, deepening from 4 and 5 fathoms ($7^{m}3$ and $9^{m}1$), at a distance of a few yards from the cliffs, to 12 and 14 fathoms ($21^{m}9$ and $25^{m}6$), at a convenient distance for anchorage, but no soundings are shown on the chart. The bottom is similar to that off Cape Voltas.

Harrison cove is a small indentation, about half a cable in extent, in the south-eastern part of Peacock roadstead; from seaward this cove has the appearance of a quarry, but it is not very conspicuous. It is open north-westward, and has no protecting reef, but it is considerably sheltered from the south-westerly winds and swell. The bottom is rocky, and it is not a safe anchorage for even one small vessel, though landing might be effected there, but with difficulty owing to a ledge of rocks near the beach. It has been stated that rollers sometimes break as far out as the line joining the entrance to Alexander bay and Harrison cove.

Southward of Harrison cove there are several narrow chasms in the cliff into which boats could enter, but an anchor should be let go before entering for the purpose of hauling out again.

Homewood harbour.—This small bay is situated close under the northern Twin (*Lat. 29° 46′ S., Long. 16° 34′ E.*), and is nearly circular in shape with receding sides rising from heights varying from 60 to 80 feet ($18^{m}3$ to $24^{m}4$), suggesting the idea of an enormous amphitheatre. The northern side of the harbour is rocky and shoal, and a sea is sent in by the slightest southerly wind; but there is sufficient space on the southern side of the bay for small craft, with local knowledge, to lie, at all times sheltered and in safety, in a depth of about 12 feet ($3^{m}7$) if properly secured; the bottom is, however, rocky and uneven. The entrance is open in a westerly direction, and is very narrow and difficult, having to be taken obliquely as rocks project from the northern and southern sides nearly half-way across.

In very moderate weather, a south-south-westerly wind frequently

Charts 578, 1013, 2202a, 2203, 2127.

Chart 897.

causes a break right across the entrance. At about the middle of the harbour, a rocky spur extends for a considerable distance towards the southern entrance point, and has a depth of 9 to 10 feet ($2^{m}7$ to $3^{m}0$) alongside it; landing could be effected on its southern side in perfectly smooth water. The steep beach at the head of the harbour is of small shingle.

Coast.—From Homewood harbour the coast trends in a general south-south-easterly direction for about 33 miles to Port Nolloth, and is backed by country similar to that in the vicinity of Peacock roadstead, *see* page 278.

Sandkop is a hill, 71 feet ($21^{m}6$) high, situated on the coast about 4 miles southward of the entrance to Homewood harbour.

Wreck point, whence the coast recedes in a south-easterly direction, is situated about 3 miles south-south-eastward of Sandkop.

Holgat river (*Lat. 28° 59′ S., Long. 16° 43′ E.*), the mouth of which is situated about 8½ miles south-eastward of Wreck point, has rocks extending in a south-westerly direction for about half a mile from its northern entrance point.

Between the mouth of Holgat river and Port Nolloth, rocks fringe the coast for from one quarter of a mile to one mile offshore.

Jackals pit is situated on the coast about 9 miles south-south-eastward of the mouth of Holgat river.

Cliff point is situated about one mile southward of Jackals pit.

Dangers.—The outer end of a reef of sunken rocks, extending about one mile offshore, lies about 2 miles south-westward of the southern Twin. This reef breaks with a heavy swell, but is very dangerous to strangers, as frequently there is no break on it beyond a short distance from the coast.

Another reef of sunken rocks, similar in character to the above, extends about one mile in a south-westerly direction from Sandkop.

Soco reefs usually break; they lie about 1½ miles south-south-eastward of Wreck point and about three-quarters of a mile offshore.

A dangerous rock, which breaks occasionally, lies about 2½ miles south-south-westward of Cliff point, and at about 2 miles from the coast.

Chart 1234.

PORT NOLLOTH.—This small harbour is situated in a slight indentation of the coast about 18 miles south-south-eastward of the entrance to the Holgat river. A conspicuous range of reddish coloured sand hills, about 600 feet ($182^{m}9$) high, and situated about 5 miles eastward of the port, is of assistance in identifying the locality, *see* view on chart 1234.

A conspicuous red tank stands close within the coast about 4¾ cables northward of South point, described below.

North point, at the northern end of the indentation, is a sandy point about 30 feet ($9^{m}1$) high, and has a ledge of rocks extending about one cable from it, off which there are heavy breakers extending over a cable seaward.

South point, situated about 1¾ miles south-south-eastward of North point, is a low sandy point with rocky ledges extending over a cable from it, on which the sea breaks heavily; close southward of the point is Owen island. This island is about 10 feet ($3^{m}0$) high, with rocky

Chart 1234.

ledges extending from it; the island is separated from the mainland by a channel, about 40 yards ($36^{m}6$) wide, over which there is a footbridge; the channel is foul and dries at low water.

A reef extends in a south-south-easterly direction for about half a mile from North point and on it, at about 4 cables southward of the point, is North ledge, 7 feet ($2^{m}1$) high. Off the southern end of this reef, and at about 2½ cables south-south-eastward of North ledge, is North blinder, a shoal over which there is a depth of 12 feet ($3^{m}7$).

The port is formed by a reef of rocks, which dries in places and extends in a north-north-westerly direction from Owen island for about 9 cables. On this reef, at about 2½ cables within its northern extremity, is Black Jacob rock, 4 feet ($1^{m}2$) high; and at about three-quarters of a cable northward of the northern extremity of the reef is South blinder, a shoal over which there is a depth of 11 feet ($3^{m}4$). Between the reef and the mainland, and about 1¾ cables east-north-eastward of Black Jacob rock, is Robbe islet, 3 feet ($0^{m}9$) high and surrounded by rocky ledges which dry and form a good protection to the anchorage off the town.

Inner blinder (*Lat. 29° 15′ S., Long. 16° 52′ E.*) is a dangerous rocky shoal which dries about 2 feet ($0^{m}6$), and lies about 1½ cables northward of Robbe islet.

Bar.—Depths.—Channels.—The entrance to Port Nolloth is between North and South blinders, but the passage, which is about 1¾ cables wide, is obstructed by a rocky shoal named The Bar, having depths of from 13 to 17 feet ($4^{m}0$ to $5^{m}2$) on it. With a swell, the sea breaks heavily on both sides of the channel and frequently breakers extend right across the passage, preventing entry or egress for as long as three consecutive days.

A channel, which leads southward to the quay and anchorage, has a depth of about 9 feet ($2^{m}7$); it was opened, by blasting and dredging, in 1885.

The depths in the inner anchorage are from 11 feet to 13 feet ($3^{m}3$ to $4^{m}0$), and those at the anchorage off the port are about 23 fathoms ($42^{m}1$).

The channel tends to silt owing to sand being blown offshore into the harbour by strong easterly winds; this is being remedied by the planting of bushes on the sand dunes about the town; the northerly current which sets through the harbour soon clears away the silt.

Quay.—There is a concrete quay, 200 feet ($61^{m}0$) in length, running in a north-south direction, situated about 1½ cables east-north-eastward of Robbe islet. In 1949, it had a depth of 12 feet ($3^{m}7$) alongside. Small vessels can lie alongside. There are two 10-ton steam cranes on the quay.

Lights. — Fog-signal. — Beacons. — Buoyage. — North beacon, painted black, surmounted by a barrel, is about 50 feet ($15^{m}2$) in height, and stands on a sand dune about 36 feet ($11^{m}0$) high, situated on the coast about 3 cables south-eastward of North point, *see* sketch on chart 1234.

South beacon, about 50 feet ($15^{m}2$) in height, is also painted black surmounted by a barrel, and stands on a sand dune about 50 feet ($15^{m}2$) in height about 1¾ cables east-north-eastward of the extremity of South point, *see* sketch on chart 1234.

F beacon, in shape a truncated cone, painted black and surmounted

Charts 897, 578, 1013, 2202a, 2203, 2127.

Chart 1234.

by a triangle, about 30 feet ($9^{m}1$) in height, is situated about 3¼ cables east-north-eastward of the front leading light-structure, described below. *See* sketch on chart 1234.

A light is exhibited, at an elevation of 60 feet ($18^{m}3$) from a white iron column, known as Carl von Schlick beacon, situated close to the beach about 4 cables northward of the quay. A fog-signal is sounded from a station near the lighthouse.

The Bar light is exhibited, at an elevation of 7 feet ($2^{m}1$), about half a cable west-south-westward of the light described above. This light in line with the light on Carl von Schlick beacon, and with F beacon, bearing about 066°, leads over the bar. It exhibits a *white* light when it is safe to cross the bar, or a *red* light when the bar is impassable. Should both these lights appear to be irregular the bar should be regarded as impassable.

A cylindrical light-and-bell-buoy, exhibiting a *red flashing* light showing a *short* flash *every three seconds*, is moored about half a cable inside the bar and a short distance southward of the leading line.

A buoy is moored on the western side of the dredged channel leading to the quay at Port Nolloth, at about half a cable eastward of Inner blinder. There are several shoal patches southward of this buoy.

Inner blinder (*Lat. 29° 15′ S., Long. 16° 52′ E.*) is marked by a beacon consisting of a staff surmounted by a cage. This beacon is painted black, but usually shows almost white owing to deposits of guano.

The western side of the dredged channel leading to the quay is marked by five black buoys.

Anchorage.—Directions.—Pilots.—Caution.—The best anchorage outside the reefs is nearly one mile off the bar, in a depth of about 23 fathoms ($42^{m}1$), sand, with North beacon bearing 048°, and South beacon 112°; eastward of this the bottom is rocky. This position is a favourable one for communicating with the shore, but vessels at anchor there frequently roll heavily. Landing should not be attempted in ships' boats, motor boats are available for this purpose.

The marks for crossing the bar have already been described, the alignment of the leading marks leads across the bar in a least depth of about 15 feet ($4^{m}6$), and, though there is a greater depth northward of the leading line, the sea occasionally breaks, even in fine weather, nearly a cable southward of North blinder. The line of the leading marks should be closely followed until the light-and-bell-buoy is reached, when course may be gradually altered to pass through the dredged channel, which is buoyed, to the inner anchorage.

The inner anchorage is between Robbe islet and the town, and vessels may lie there in safety, for, although the sea may break heavily on the reefs and across the entrance, no heavy seas come far within them.

The best position in which to anchor is westward of the quay (*Lat. 29° 15′ S., Long. 16° 52′ E.*), in a depth of about 10 feet ($3^{m}0$); southward of this is the anchorage for lighters, which is usually fully occupied.

The northern end of the harbour is useless for any purpose, as, with a moderate south-westerly swell, the sea, at high water, breaks right over the northern reef on to the beach. Kelp reef, with depths of 7 feet ($2^{m}1$) over it, lies about 1½ cables southward of North beacon.

Charts 897, 578, 1013, 2202a, 2203, 2127.

Chart 1234.

A pilot may be obtained by making the usual signal: strangers should never attempt to enter the port without one.

Signals.—There is a signal station at the lighthouse with which vessels can communicate, by day only, by the International Code of Signals.

The following signals are displayed by day from the signal station:—

1. A red and white ball, half way up to the yard-arm, indicates that the bar is dangerous.
2. A red and white ball at the yard-arm indicates that the bar is impassable.

Current.—The current in the port, which attains a velocity of from half a knot to 3 knots, according to the strength of the prevailing south-westerly winds, enters through the reef close north-westward of South point, and after passing through the inner anchorage runs out across the bar and the southern part of the northern reef, in a north-westerly direction, losing some of its strength as it crosses them.

Outside the reefs, the current usually runs in a northerly direction at the rate of from half a knot to one knot. Northerly winds, if fresh and blowing for some time, check this current, which with a continuance of the same for some days on end will run in the opposite direction, but it seldom attains a velocity greater than half a knot. In July 1891, a southerly set of 3 knots was reported. The southerly current ceases as soon as the northerly wind causing it drops.

Town.—This small town is of some importance, being the principal port for Namaqualand. The copper mines at O'okiep find their outlet at this port. Considerable trade is carried on with the diamond fields at Alexander bay (page 277) and Kleinzee, about 30 miles southward of Port Nolloth.

The town is built on low-lying land on the eastern side of the harbour, and is fairly conspicuous. In 1951, the population was 1,942, of whom 460 were Europeans.

At the southern end of the harbour are two fish canneries, each with a pier 200 feet ($61^{m}0$) in length, with depths of 8 to 10 feet ($2^{m}4$ to $3^{m}0$) alongside.

Port facilities.—There is a patent slip; for particulars *see* Appendix. II.

Water is scarce and of poor quality. Meat is plentiful and good; notice should be given, however, for large quantities. Bread is obtainable in small quantities. Vegetables can only be obtained if a supply is ordered from Cape Town. Other provisions are obtainable in fair quantities.

Small repairs to machinery and boilers can be undertaken by the railway workshops.

Life-saving.—A line-throwing apparatus is maintained at Port Nolloth (*Lat. 29° 15' S., Long. 16° 52' E.*).

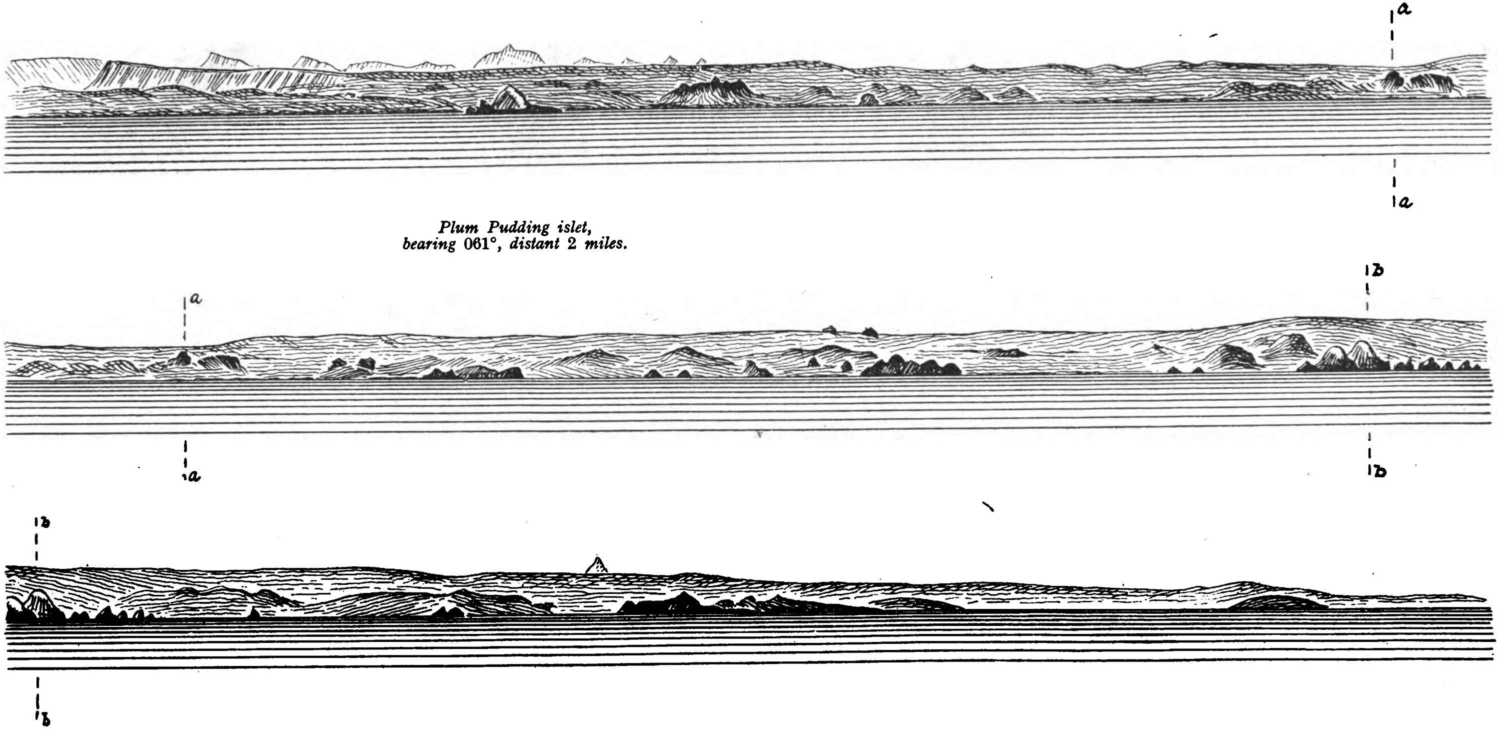
Communications.—There is regular steamer communication with Cape Town.

Shipping.—In 1949-50, 212 small craft with an aggregate gross tonnage of 38,959 tons entered the port.

Climatic table.—*See* page 78.

PORT NOLLOTH TO CAPE DESEADA.—John Owen bay.—Eastward of Owen island is a small indentation called John Owen bay,

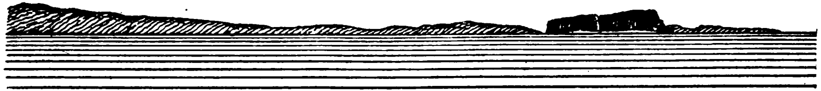
To face page 282.



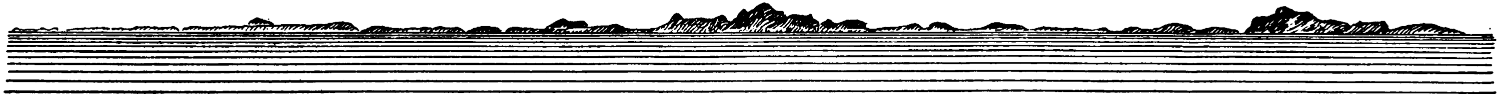
Plum Pudding islet,
bearing 061°, *distant* 2 *miles.*

View, in three parts, of the coast southward of Plum Pudding islet.
(*Original dated* 1912.)

To face page 283.



Peacock roadstead from north-westward.
(*Original dated* 1882.)



Kapiteinskloof from north-north-westward.
(*Original dated about* 1882.)

Chart 1234.

which is open south-westward; with a moderate swell from that direction, breakers extend right across the entrance, and, with a heavy swell, the whole bay is a mass of broken water. With the swell from between North and West the bay is sheltered, but no attempt should be made to enter it without local knowledge. At the northern end of John Owen bay is a small slip.

Chart 897. Plan of MacDougall harbour.

MacDougall harbour.—This so-called harbour is situated immediately southward of John Owen bay, and is formed by a slight indentation in the coast from the northern and southern entrance points of which reefs extend southward and northward, respectively. On these reefs are several islets or rocks, Matthew rock lying near the northern end of the southern reef.

The entrance to the harbour is at a short distance northward of Matthew rock, and is about half a cable wide, with a depth in it of 1½ fathoms ($2^{m}7$); it leads into a small basin in which there is a depth of 1¼ fathoms ($2^{m}3$), sand, where small vessels might lie in safety in the summer season.

The southern part of the harbour is completely sheltered, and the water in it is quite smooth, even when a heavy surf is breaking outside. The depths in it are from 3 to 6 feet ($0^{m}9$ to $1^{m}8$), and it has a sandy beach on which boats might be hauled up. The sea is so smooth that a vessel could take the ground at low tide without injury.

The depths, as also the nature of the bottom, outside this small harbour appear to be irregular.

Chart 897.

Coast.—From Matthew rock the coast trends in a south-south-easterly direction for about 25 miles to the mouth of Buffels river (*Lat. 29° 41′ S., Long. 17° 03′ E.*). The sides of the hills which back the coast are grass-covered, but their summits give evidence of their volcanic origin.

Ubeep cove is a small indentation in the coast about 3½ miles south-south-eastward of Matthew rock. Wedge point is situated about 5 miles south-south-eastward of Ubeep cove, with Sandown point 6½ miles further south-south-eastward.

The neighbourhood of Buffels river may be recognised from seaward by a remarkable sand cliff, or vertical gap, of considerable dimensions, at the summit of a flat sand hill, apparently 400 or 500 feet ($121^{m}9$ or $152^{m}4$) high. *See* view on chart 897. When this sand cliff bears more than 115°, it is hidden by a nearer range of sand hills. At times, in the rainy season, boats can enter the river, but only at high water; whilst in the dry season, its mouth is frequently closed by a sandy barrier, formed by the drift of the sand hills in windy weather.

The diamond diggings at Kleinzee are situated on the south bank of Buffels river, about one mile from the mouth.

Chart 896.

The coast from the mouth of Buffels river to Hondeklip bay, situated about 40 miles south-south-eastward, is rocky, with breakers and dangers extending one mile offshore.

Inland are hills, generally over 400 feet ($121^{m}9$) high, the highest of which is Zwart kop, 931 feet ($283^{m}8$) high, situated about 4 miles from the coast and 20 miles south-south-eastward of the mouth of Buffels river. About 5 miles southward of this hill, and at a short

Chart 896.

distance inland, is a very conspicuous sand patch, the upper part of which is long and narrow.

Milkbosch point projects slightly from the coast about 8 miles southward of the mouth of Buffels river.

Nass Nass point, upon which there is a prominent rock, is situated about 7½ miles south-south-eastward of Milkbosch point; Skulpfontein point lies about 11 miles further south-south-eastward.

Zwart Lintjes river, the mouth of which is situated about 10 miles south-south-eastward of Skulpfontein point, and about 3 miles northward of Hondeklip bay, is entirely barred by sand, and rocks extend about half a mile from it. The water in the river is brackish.

Chart 897.

Dangers.—Penguin rocks, about 6 feet ($1^{m}8$) high, lie nearly half a mile offshore about 21 miles south-south-eastward of Matthew rock. Rocks, which break with a heavy swell, extend for a distance of about one mile westward and 2 miles southward from Penguin rocks. Southward of these rocks, the coast is foul for nearly one mile offshore as far as the mouth of Buffels river.

The master of the German ship *Ostara* reported, in 1910, having, when about 6½ miles west-south-westward of the entrance to Buffels river, struck a rock lying at a distance of about 9¼ miles north-westward of Milkbosch point. Broken water, which appeared to indicate the position of a submerged reef or sunken wreck was sighted close to this position by the master of the British ship *Crocodile* in 1911. It appears probable that this is the rock on which the barque *Ocean King* was lost in 1881. On two occasions in 1911 search was made for this rock by H.M.S. *Mutine*, but no danger was discovered; its position is therefore doubtful.

Chart 896.

A rock, which breaks with a heavy swell, lies about 6 miles southward of Milkbosch point and about 1½ miles west-north-westward of a rock, 8 feet ($2^{m}4$) high, lying close inshore.

A rock, with depths of less than 6 feet ($1^{m}8$) over it, lies close north-westward of Nass Nass point, and rocks awash and just above water extend for up to 1¼ miles offshore between Nass Nass point and Skulpfontein point.

Chart 897.

Beacons.—A small beacon, consisting of a pile of stones, stands on the summit of a hill, 695 feet ($211^{m}8$) high, known as Buffels Kop, situated about 3 miles inland, and 5 miles north-north-eastward of the mouth of Buffels river.

Gourap beacon (*Lat. 29° 45′ S., Long. 17° 06′ E.*) is a similar cairn on the summit of a hill, 603 feet ($183^{m}8$) high, situated about 1¼ miles inland and 3 miles north-north-eastward of Milkbosch point. *See* view on chart 897.

Neither of these beacons can be easily seen from seaward, except by small craft close inshore.

Chart 896, plan of Hondeklip bay.

Hondeklip bay.—This small bay receives its name from an isolated block of granite named Hondeklip or Dog-stone, which serves to indicate the position of this otherwise indistinguishable cove. The stone is 17 feet ($5^{m}2$) high and is situated about 2 cables inland and 4 cables southward of the head of the bay.

Chart 896, plan of Hondeklip bay.

Hondeklip bay is about 3 cables wide between its entrance points, but rocks and foul ground extend from both, narrowing the passage into it to half a cable. The bay, which is only suitable for small vessels, is easy of access, and is sheltered from all but westerly winds which seldom blow. There is a good beach in the southern part of the bay, and the best landing place is just inside the rock at its western end.

There are two flagstaffs; one near the head of the bay, which is used for communicating with vessels, and the other on its southern entrance point. On this point also are two cask beacons.

Light.—Fog signal.—A light is exhibited, at an elevation of 21 feet ($6^{m}4$), from an iron column on a white square concrete structure, 9 feet ($2^{m}7$) in height, situated about three-quarters of a cable northward of the flagstaff near the head of the bay.

A fog signal is sounded occasionally from the light-structure.

Anchorage.—The best anchorage appears to be in a depth of about 10 fathoms ($18^{m}3$), with the flagstaff at the head of the bay bearing about 105°, distant about one mile; but it is an open roadstead with indifferent holding ground.

Southward of this anchorage, and about 7 cables westward of the Hondeklip there is some uneven rocky ground, with a least charted depth of 5 fathoms ($9^{m}1$) over it, which should be avoided, as at times there are heavy rollers on it.

Moorings have been laid for the use of the small steamer that brings supplies from Cape Town.

Chart 896.

Current.—The current off the coast in the vicinity of Hondeklip bay usually runs northward; but after a long continuation of northerly winds it sets in the opposite direction.

Coast.—Beacon.—From Hondeklip the coast trends in a south-south-easterly direction for about 9 miles to North point, the northern entrance point of Roodewal bay and possesses few features that can be distinguished at any distance, the hills being long ridges without definite summits; it is fringed with sunken rocks and breakers extending about half a mile offshore.

Plaat Klip point (*Lat. 30° 20′ S., Long. 17° 16′ E.*) is situated about one mile southward of Hondeklip bay, and has on it a large barrel erected on a pole.

Chart 896, plan of Roodewal bay.

Roodewal bay.—Caution.—At the head of this small bay (*Lat. 30° 27′ S., Long. 17° 21′ E.*) there is a vertical cliff of red sandstone, from 36 to 40 feet ($11^{m}0$ to $12^{m}2$) high, the almost level summit of which is surmounted by a sloping bank of white sand of about equal height. This red cliff with its white crest is easily identified from seaward when bearing about 065°.

It is reported that the bay has silted up and that the anchorage used by H.M.S. *Frolic*, in 1854, is now all breakers. The rest of the bay affords no shelter; the plan on chart 896 does not indicate the present state of the bay.

Chart 896.

Spoeg River bay.—Dangers.—The mouth of Spoeg river is situated about one mile southward of Roodewal bay, in a sandy bay, known as Spoeg River bay or Mitchel's bay, about the same distance

Chart 896.

wide, which is much sheltered in a south-westerly direction by a group of rocks about half a mile from it, but is quite unprotected in other directions. The bay has an even sandy bottom, gradually shoaling from about 13 fathoms ($23^{m}8$) at a short distance from the rocks; at about half a cable from the shore there is a considerable surf, immediately outside which there are depths of 7 or 8 feet ($2^{m}1$ or $2^{m}4$). The only landing place appears to be on the rocky shore on the southern side of the bay about one or 1½ cables southward of the mouth of the river, but at low water a boat would be unable to approach within some yards of the shore.

The rocks which break the force of the south-westerly swell appear to be nine in number; frequently the sea does not break on them, but in a fresh south-westerly breeze the breakers extend throughout the group. The northernmost rock lies about half a mile west-south-westward of the southern point of Spoeg River bay; it is only a few yards in extent and has depths of 6 and 7 fathoms ($11^{m}0$ and $12^{m}8$) round it. From this rock, the group extends in a south-easterly direction and is about one-quarter of a mile wide; there are depths of from 7 to 9 fathoms ($12^{m}8$ to $16^{m}5$) close to the outer edge of the surf.

There appears to be a clear passage, about one-quarter of a mile wide, with depths in it of from 4 to 5 fathoms ($7^{m}3$ to $9^{m}1$), between the southernmost rock and the southern point of the bay.

The depths outside the bay decrease regularly from 20 fathoms ($36^{m}6$), at about three-quarters of a mile seaward of the rocks, to 8 or 9 fathoms ($14^{m}6$ or $16^{m}5$) at a few yards from them.

Charts 896, 578.

Coast.—Aspect.—From the mouth of Spoeg river, the coast trends in a south-south-easterly direction for about 86 miles to the mouth of Olifants river, and possesses few features that can be distinguished at any distance, the hills being long ridges without definite summits.

Roodewal (*Lat. 30° 33′ S., Long. 17° 28′ E.*) is a hill, with a bare granite top, which rises rather abruptly on its northern and southern sides, the former being the steeper of the two, to an elevation of 622 feet ($189^{m}6$). It is situated about 2 miles inland from Strandfontein point, and 16 miles south-south-eastward of Plaat Klip point. On the summit of this hill, there is a stone beacon, 14 feet ($4^{m}3$) in height, which in clear weather is very conspicuous.

Louis Fontein is a mountain, 1,859 feet ($566^{m}6$) high, situated about 14 miles inland, and 40 miles south-eastward of Roodewal hill; a range of mountains which rises to elevations of over 5,000 feet ($1{,}524^{m}0$) lies parallel with the coast about 40 miles inland, between Spoeg river and Olifants river.

Krakeel Klip, 1,131 feet ($344^{m}7$) high, is situated about 10 miles inland and nearly 20 miles south-south-eastward of Louis Fontein mountain; it is the best landmark on the coast in its vicinity.

Charts 578, 1013.

Off-lying bank.—A bank, with depths of 108 fathoms ($197^{m}5$) over it, was reported, in 1950, to lie in a position about 82 miles west-south-westward of Spoeg River bay.

A bank with depths of 40 fathoms ($73^{m}2$) over it, was reported in 1937 in position lat. 30° 55′ S., long. 15° 04′ E.

Charts 896, 578.

Coast.—The entrance to Bitter river is situated about 3 miles

Charts 578, 2095, 1013, 2202a, 2203, 2127.

Charts 896, 578.

south-south-eastward of Strandfontein point; the southern shore of the bay in which it is situated has some rocks, 6 feet ($1^{m}8$) high, lying off it.

Groene river entrance is situated about 17 miles south-south-eastward of that of Bitter river, and is closed by sandbanks. There is a small farm settlement about one mile from the mouth of the river.

Island point lies about 4½ miles south-south-eastward of the mouth of Groene river.

Braak river entrance, situated about 12½ miles south-south-eastward of Island point, also appears to be closed, and has some rocks extending seaward for nearly one mile from its northern side. The settlement of Nieuwfontein is situated on Braak river, about 10 miles from its mouth.

Zout river entrance is closed by sand, and lies about 11 miles south-south-eastward of that of Braak river.

Dangers.—Caution.—The coast between the mouth of Spoeg river and the mouth of Braak river, a distance of about 42 miles, is fringed with sunken rocks and breakers extending about one mile offshore.

Strandfontein point (*Lat. 30° 34′ S., Long. 17° 25′ E.*), situated about 6 miles southward of the mouth of Spoeg river, has some sunken rocks which break, extending west-south-westward for nearly three-quarters of a mile from it.

The Twins are two sunken rocks, which break with a swell, lying about one mile offshore, about 12 miles south-south-eastward of the mouth of Bitter river.

Southward of the mouth of Braak river, as far as that of Olifants river, the coast appears to be almost free from off-lying dangers, and has no conspicuous objects on it, with the exception firstly of a large rock, which lies apparently close to the coast in the vicinity of the mouth of Zout river, and secondly of Elephant rock.

Elephant rock, lying about 4 miles north-north-westward of the mouth of Olifants river and about 3 miles south-south-eastward of Cliff point, is 50 feet ($15^{m}2$) high, and lies about 4 cables from the coast to which it is almost joined by a reef of above-water rocks; there is also a reef of rocks extending about one cable from its western extremity. This rock is one of the Government guano islands, *see* page 19.

As the depths shown on the chart are few, great caution should be exercised when passing along or approaching the coast between Spoeg River bay and Olifants river.

Chart 896.

Olifants river.—The mouth of this river, at one time known as Elephant river, is situated about 32 miles south-south-eastward of that of Zout river. Captain Morrell, describing it in 1828, observes:—

"This river is not navigable for vessels, nor even boats, unless the sea is very smooth, as there is a bar stretching across its entrance, with only 2 feet ($0^{m}6$) on it; and as the westerly swell is constantly heaving in on this coast, there are generally heavy breakers on the bar. But within this bar there is plenty of water for a large ship, for the distance of 2 miles up the river as far as a village where several Dutch farmers reside. If there could be a passage cut through the bar at the mouth of this river, it would be the finest harbour on the west coast of Africa."

The small settlement of Papendorp (*Lat. 31° 42′ S., Long. 18° 13′ E.*) is situated on the shore of the lagoon about one mile eastward of the

Chart 896.

entrance. Papendorp is connected by road with Koekenaap, a settlement situated on Olifants river about 15 miles from its mouth.

Koekenaap is connected to the general railway system.

Coast.—About 4 miles south-south-eastward of the entrance to Olifants river, and immediately inland of a point known as Curlew Strand, is the small settlement of Strandfontein.

Donker Gatte is a point on the coast about 1¾ miles south-south-eastward of Curlew Strand, and forms the northern entrance point of Bamboes bay. Bruin point, about three-quarters of a mile southward of Donker Gatte, is the southern point of Bamboes bay.

Thorn bay.—Jetty.—This small bay is situated on the northern side of Thorn Bay point (*Lat. 31° 49′ S., Long. 18° 14′ E.*), about 7½ miles southward of the mouth of Olifants river and is only accessible to boats. There is a sheltered sandy beach for landing where there is a jetty, but the approach to it is somewhat intricate, and should not be attempted without local assistance. In 1902, H.M.S. *Blanche* anchored about one mile offshore in a depth of about 20 fathoms ($36^{m}6$). There is a small settlement on the shores of the bay.

Charts 896, 2091.

Coast.—Captain Morrell, writing in 1828 of the coast southward of Olifants river, observes :—

" The land between Elephant river and St. Helena bay deserves a few descriptive remarks. Bluff sandhills moderately elevated are seen from half to 1½ cables back from the beach. About half a mile from the latter, the sandy ground begins to terminate, and the soil to commence ; and another half mile farther inland brings us to good soil, where the plains are as fine for grazing as any in the world.

" Between the beach and the sandhills just mentioned there is a fine road, running a great part of the distance between the two places. The whole coast along here exhibits unequivocal evidences of its once having been agitated by volcanic eruptions ; such as lava in irregular masses, with different strata distinctly defined. Pumice stone is scattered over the country for many miles inland, forming irregular hills, interspersed with lava, basalt, and other volcanic productions."

Donkin bay, on the sandy shores of which the sea breaks heavily, is situated on the northern side of Cape Donkin, about 7½ miles southward of Thorn Bay point, and its entrance is about 1½ miles wide. The northern point of the bay is called Groothoek.

The coast in the vicinity of Donkin bay is very level, and when 5 miles offshore there are few objects near the coast by which the position of a vessel may be determined ; but inland there is a remarkable tableland, of moderate height, which terminates northward in a vertical bluff. When within 4 or 5 miles offshore, this tableland is obscured on south-easterly bearings by land nearer the coast ; although the bluff is sometimes seen when farther northward, it would not then attract the attention of a stranger so readily as it does when seen from a position farther southward.

Northward of Donkin bay, the depths at about 10 miles offshore are about 60 fathoms ($109^{m}7$), and fairly regular.

Anchorage.—In Donkin bay, anchorage may be obtained by vessels with local knowledge in depths of from 6 to 10 fathoms ($11^{m}0$ to $18^{m}3$), sand, but as the bay is open westward the anchorage is unprotected.

Charts 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127.

Chart 2091, plan of Lambert bay.

Lambert bay.—This bay is situated about 9 miles southward of Cape Donkin, and is about half a mile wide. It is partially protected by Penguin islet, but the south-westerly swell, though slight outside, frequently enters the bay round the reef extending northward from the islet, and makes the anchorage uncomfortable. The bay is open to north-westerly winds, but is sheltered by the islet from those from south-westward.

Penguin islet (*Lat. 32° 05′ S., Long. 18° 18′ E.*), 40 feet ($12^{m}2$) in height, lies off the south-western entrance point of the bay, and between the two there is a narrow channel encumbered with rocks. Rocks extend about 2¾ cables north-north-westward from the north-western extremity of Penguin islet, the outer rock being always visible. There is a detached 3-fathom ($5^{m}5$) patch lying about three-quarters of a cable north-eastward of the outer rock, and at about the same distance north-westward of Penguin islet there is a rock 10 feet ($3^{m}0$) high. Penguin islet is one of the Government guano islands, *see* page 19.

There is a settlement at Lambert bay, which is the seaside resort of the neighbouring country. In 1951, it had a population of 3,189, of whom 875 were Europeans. Breakwaters have been constructed on both the north-eastern and the south-western sides of Penguin islet; eastward of the north-eastern breakwater is a small pier with a depth of 4 feet ($1^{m}2$) alongside it.

On the mainland, south of the breakwater on the south-western side of Penguin islet, is a breakwater running in a north-westerly direction and leaving an entrance to the bay of about 100 feet ($30^{m}5$) between the two breakwaters. About 300 feet ($91^{m}4$) eastward of this breakwater is a quay 490 feet ($149^{m}3$) in length, with a least depth alongside it of 10 feet ($3^{m}0$).

There is a patent slip at Lambert bay for boats of 40 tons deadweight.

Light.—A light is exhibited, at an elevation of 40 feet ($12^{m}2$), on the head of the breakwater extending from the south-western side of Penguin islet.

Danger.—Fisherman's ledge, lying about 6½ cables north-north-eastward of Penguin islet and from 3 to 5 cables offshore, has depths over it of from 3½ to 5 fathoms ($6^{m}4$ to $9^{m}1$).

Anchorage.—Anchorage, in a depth of 6 fathoms ($11^{m}0$), can be obtained, but steam should be kept at command, as frequently the sea gets up with little or no warning, filling the whole bay with breakers. Vessels at anchor in Lambert bay should proceed to sea immediately the wind gets northward of west.

Chart 2091.

Cape Deseada.—Shoal.—Caution.—Cape Deseada or Baboon point is situated about 14 miles southward of Penguin islet. When seen from seaward at a distance of about 9 miles it appears bold and cliffy, rising at a steep slope from the sea to the summit of a flat-topped range of sandhills, 638 feet ($194^{m}5$) high. The cape terminates in a low sandy point which is not easily seen from the offing; immediately northward of it is a conspicuous sandy patch.

On the northern side of the cape is Elands bay, where there is a small settlement. A lagoon, known as Verloren Vallei, extends eastward and south-eastward for about 8 miles from the bay, at the head of which is the village of Redelinghuis.

Charts 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127.

Chart 2091.

A rocky shoal, on which the sea breaks in heavy weather, lies about 2¾ miles north-westward of Cape Deseada.

Vessels approaching this part of the coast should do so with great caution, as the depths off it have not yet been fully ascertained.

ST. HELENA BAY.—Cape Deseada is the north-eastern entrance point of St. Helena bay which extends thence as far as Cape St. Martin, a distance of about 32 miles in a south-westerly direction.

Cape St. Martin (*Lat. 32° 43′ S., Long. 17° 55′ E.*) is a low sandy point projecting northward from the high land on the south-western side of the bay, and from it a reef of rocks extends north-north-westward for about half a mile ; off the outer end of this reef lies Britannia rock, which is visible at low water.

Stompneus and Shell Bay points are the north-eastern and north-western extremities, respectively, of a peninsula which projects about 1½ miles from the coast, about 2½ miles eastward of Cape St. Martin.

Britannia bay is the indentation in the coast between Cape St. Martin and Shell Bay point.

Stompneus bay is situated on the eastern side of the peninsula, and in it there is a fishing village.

There are several farms scattered along the shores of St. Helena bay.

Berg river flows into the head of St. Helena bay, about 9 miles south-eastward of Stompneus point (*Lat. 32° 42′ S., Long. 17° 59′ E.*). The mouth of the river is only about 40 yards ($36^{m}6$) wide, and it is difficult to make out, but the light-structure and the houses at Laai-Plek, a fishing village, about one mile eastward of its mouth, can be seen from the bay, as also a prominent flagstaff, and the three masts of a hulk lying in the river. Varkvlei farm, situated about 2 miles westward of the mouth of Berg river, consists of about half a dozen white buildings and forms a good mark. For about 30 miles from its mouth the river is tortuous, about 60 yards ($55^{m}9$) in width, and has depths in it of from 5 feet to 5 fathoms ($1^{m}5$ to $9^{m}1$). In 1906, the depth on the bar was 7 feet ($2^{m}1$) at high water neap tides, but it is subject to change. The village of Velddrift is situated about 4 miles from the mouth of the river, and is an important fishing station.

In the northern part of the bay, the shore is fairly steep-to, a depth of 10 fathoms ($18^{m}3$) being found within one mile of the beach ; but in its south-eastern part, there are depths of 5 fathoms ($9^{m}1$) and less from 2½ to 3½ miles offshore, and the depths appear to be decreasing.

In the bay, the bottom is mostly sand and mud ; but a great part of the western side of the bay, from about half a mile southward of Stompneus point to the mouth of Berg river, is fringed with rocks, some of which lie half a mile offshore.

Aspect.—About 5 or 6 miles south-south-eastward of Cape Deseada the country rises to abrupt, craggy eminences, and broken ridges of lofty hills, which extend 30 miles in that direction and terminate in Piquetberg range of mountains.

Kleintafel berg, 1,190 feet ($362^{m}7$) high, rises about 16 miles south-south-eastward of Cape Deseada, and appears from seaward to be much closer to the coast than it is in reality. It is a well-defined dark hill, rising steeply from low land on either side ; it is table-topped, but its summit is rather uneven. There is higher land behind it, some of the mountains in which are also table-topped. *See* view on chart 2091.

Charts 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127.

Chart 2091.

Kapiteinskloof, 3,410 feet (1,039^{m}4) high, is a very prominent summit in Piquetberg range. From a position about 10 miles offshore, the kloof and its range appear as if situated close over the coast, and must not be mistaken for the higher range farther inland. The kloof is a well-defined summit; the highest part of the range farther inland is bold, its northern face appearing precipitous. On a south-easterly bearing this part of Piquetberg range appears as two sharp peaks close to one another, the eastern being the lower. To the right of these appears a rounded hill, not quite so high, which slopes gradually and then rises again to a moderate height in another gradual slope which terminates with the appearance of a rounded bluff. This bluff, when seen from a distance, appears to slope down to the sea, the considerable tract of intervening low-lying land then being invisible. *See* view on chart 2091 and facing page 283.

Dangers.—North blinder or Martin rock is a rocky ledge, lying in the approach to St. Helena bay. There are depths of from 6 to 8 fathoms (10^{m}9 to 14^{m}6) over it, and 21 to 26 fathoms (38^{m}4 to 47^{m}5) close-to all round. The sea breaks upon it with a heavy swell and its shoalest part lies about 4 miles northward of Shell Bay point (*Lat. 32° 42′ S., Long. 17° 58′ E.*).

Britannia blinder is a rocky shoal lying about 3 miles west-north-westward of Cape St. Martin. The least depth on it is 3 fathoms, and there are depths of from 17 to 24 fathoms (31^{m}1 to 43^{m}9) round it. The sea breaks upon it with a moderate swell.

Shell Bay and Stompneus points in line, bearing 107°, leads northward of Britannia blinder, and Kasteelberg, about 5 miles south-eastward of Great Paternoster point (page 292), bearing 142°, leads south-westward of it.

A rock, over which there is a depth of 5 fathoms (9^{m}1), the position of which is doubtful and which has not been examined, was reported, in 1939, about 4½ miles east-south-eastward of Stompneus point, and about 2½ miles offshore.

Kelp reefs extend about three-quarters of a mile from the shore, 5 miles north-eastward of Berg river; and westward of that entrance, Doctor reef extends nearly one mile offshore.

Lights.—A light is exhibited, at an elevation of 38 feet (11^{m}6), from a black pyramidal wooden tower with a white band, 15 feet (4^{m}6) in height, situated on Stompneus point.

A light is exhibited, at an elevation of 34 feet (10^{m}4), from a steel framework tower on the south-western side of the entrance to Berg river.

Anchorage.—Landing.—The southern part of St. Helena bay is quite smooth in the summer months, when southerly winds prevail; but, as it is open from north-eastward to north-north-westward, the bay becomes unsafe in the winter months, when northerly winds may be expected.

Vessels with local knowledge may select any position in which to anchor in depths of from 6 to 7 fathoms (11^{m}0 to 12^{m}8), over mud and sand, at about one mile from the shore between Stompneus point and the village of St. Helena bay, situated about 4 miles south-eastward of it. The best anchorage is, in a depth of 7 fathoms (12^{m}8), abreast the village, with Stompneus point bearing about 311°.

Good anchorage may also be obtained, by vessels with local know-

Charts 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127.

Chart 2091.

ledge, about 3 miles off the mouth of Berg river in a depth of about 5 fathoms ($9^{m}1$), with Stompneus point bearing 300°.

Landing, well sheltered by a natural breakwater of rocks, can be effected in ships' boats on the beach at the fishing village of Stompneus, which lies along the shore of Stompneus bay, about 1½ miles inside the point of the same name.

St. Helena Bay village.—Communications.—This fishing village is situated at Steinberg cove, a small cove about 4 miles south-eastward of Stompneus point.

At the farms on the banks of Berg river, livestock are reared, grain is grown, and wine is produced. There is a large fishing industry, which extends up Berg river, round the shores of St. Helena bay, and along the coast as far as Saldanha bay.

The lights of a factory at St. Helena bay show up conspicuously at night when the factory is working. There is a considerable export in wine and corn. The villages of St. Helena bay and Stompneus are connected with the general telegraph system. There is occasional sea communication with Cape Town.

Charts 1232, 2091.

CAPE ST. MARTIN TO SCHOONER ROCK.—Light.—Radiobeacon.—Fog signals.—Life-saving.—From Cape St. Martin (*Lat. 32° 43′ S., Long. 17° 55′ E.*) to Schooner rock, a rock 22 feet ($6^{m}7$) high, close off North head, the northern entrance point of Saldanha bay, about 20 miles southward, the coast is very rugged and indented; but none of the bays, except Klein Paternoster bay, afford any shelter, as they are all open westward, and are consequently exposed to the heavy swell of the South Atlantic. In addition to Britannia blinder (page 291) there are numerous off-lying rocks which are very dangerous, *see* page 293.

Great Paternoster point is situated about 2 miles south-westward of Cape St. Martin, and off it a reef of rocks and several small islets extend in a north-westerly direction for about 1½ miles.

Seal island, 40 feet ($12^{m}2$) high, is the outermost of the islands off Great Paternoster point, and is one of the Government guano islands, *see* page 19. Within Seal island is Egg islet, and about one mile southward of it is a sunken rock.

From Great Paternoster point the coast trends in a southerly direction, appearing as a long sandy beach backed by sand dunes, there are several outlying rocks close inshore, and about 3 miles southward of Great Paternoster point is Tambourine rock, which is 4 cables offshore, about 8 feet ($2^{m}4$) high, and conspicuous.

The coast then forms Klein Paternoster bay, which is an important fishing station. The village of Paternoster is on the southern shore of the bay, the white houses of which are conspicuous.

Kasteelberg rises to a conspicuous summit at an elevation of 605 feet ($184^{m}4$) about 3 miles eastward of Paternoster village.

Cape Columbine or Cape Castle, is situated about 6 miles south-south-westward of Great Paternoster point, and derives its name from the peculiar shape of the hill called Castle rock, which surmounts it, and is conspicuous; *see* view on chart 2091. Rocky reefs fringe the cape, the outermost of which dries and lies nearly three-quarters of a mile north-westward from it.

Charts 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127.

Charts 1232, 2091.

A light is exhibited, at an elevation of 264 feet ($80^{m}5$), from a white square concrete tower, 50 feet ($15^{m}2$) in height, on Cape Columbine.

A radiobeacon transmits from the lighthouse and a fog signal is sounded. A line-throwing apparatus is maintained at the lighthouse.

Duminy point (*Lat. 32° 54′ S., Long. 17° 51′ E.*) is situated about 5 miles southward of Cape Columbine, and the intervening exposed bay is known as North West bay.

There are several isolated dangers about half a mile offshore, between Cape Columbine and Duminy point, and two islets called Voel Eiland are situated about 2 cables offshore and about 1½ miles north-north-eastward of the point.

Chart 1232.

Jacob bay, situated about 4 miles southward of Duminy point, is a small boat harbour used by local fishermen. The bay is easy of access in fine weather, but landing should not be attempted without local knowledge.

Fish point is situated about 6 miles southward of Duminy point, and the whole of the intervening coast is fringed with rocks and foul ground extending upwards of one mile offshore. Rocks extend southward of Fish point for a distance of about 6 cables.

Long point is situated about 1¼ miles south-south-eastward of Fish point, and rocks extend from it, in a westerly direction, for about 2 cables.

Danger bay is entered between Fish and Long points, and its entrance is contracted to a width of only 6 cables by the rocks extending from those points. As the bay is open westward, and there are several sunken rocks off its entrance which only sometimes break, it is always dangerous for a stranger to approach it. There are some conspicuous sand dunes on the northern shore of the bay.

Chart 2091.

Dangers.—Caution.—The greatest care must be exercised when navigating in the vicinity of the dangers situated between St. Helena and Saldanha bays, as many of them rise almost perpendicularly from the bottom, having as much as from 18 to 25 fathoms ($32^{m}9$ to $45^{m}7$) close to them.

At night, or in thick weather, a vessel should not get into depths of less than 50 fathoms ($91^{m}4$), which depth will be found from 3 to 4 miles outside all these dangers.

Jim Crow rock, which dries 2 feet ($0^{m}6$), lies at the north-western extremity of a rocky ledge, on which the sea breaks in heavy weather, about 2¼ miles northward of Cape Columbine.

A dangerous shoal, over which the depth is 19 feet ($5^{m}8$), lies about 1¼ miles south-westward of Cape Columbine.

Chart 1232.

Two rocks awash lie, in the approach to North West bay, about 2 miles north-westward of Duminy point, and there are two more rocks awash, close together, about one mile northward of the point.

A dangerous reef, part of which is awash, lies west-south-westward of Duminy point, its south-western extremity being nearly 1½ miles in that direction from the point.

Jacob reef (*Lat. 32° 57′ S., Long. 17° 52′ E.*), which is 12 feet ($3^{m}7$) high, is one of the Government guano islands, *see* page 19, and lies almost mid-way between Duminy and Fish points; there are several

Charts 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127.

Chart 1232.

rocks, which dry about 3 feet (0^{m}9) in its vicinity. A 35-foot (10^{m}5) patch lies about 1¼ miles north-westward of Jacob reef.

Rocks, awash, are situated about 7 cables northward, and 5 cables southward, respectively, from Jacob reef. Hospital rock, 23 feet (7^{m}0) high, lies close offshore about 6 cables eastward of Jacob reef.

The Sisters is a group of small rocks situated about 1¾ miles south-south-eastward of Jacob reef, and about 3 cables offshore.

Tooth rock, which is 3 feet (0^{m}9) high, lies about one mile west-north-westward of Fish point; and Bay rock, awash and which sometimes breaks, lies about 5 cables south-westward of that point.

Cap rock dries, and lies about 8 cables westward of Long point. A rock, over which there is a least depth of 9 feet (2^{m}7), lies about 4 cables west-north-westward of Long point.

Schooner rock in line with the peak of Jutten island (page 295), situated on the southern side of the entrance to Saldanha bay, bearing 127°, leads close westward of Cap rock.

Foul ground extends for a distance of about 3 cables offshore from a point about midway between Long point and Schooner rock, and there is a rock awash situated about 7 cables north-westward of Schooner rock.

Charts 1232, 2091.

Anchorages.—A good anchorage in 6 fathoms (10^{m}9), well sheltered from the prevailing swell, can be obtained by vessels with local knowledge, in Klein Paternoster bay, with the factory chimney, situated on the western entrance point of the bay about 4 miles southward of Great Paternoster point (*Lat. 32° 44′ S., Long. 17° 54′ E.*), bearing 222°, distant 5 cables; with wind or swell between north and west, this anchorage should not be used. There is good landing at the cray-fish factory.

A small vessel with local knowledge might, in case of necessity, obtain an anchorage in Danger bay in depths of from 3 to 4 fathoms (5^{m}5 to 7^{m}3), about one-quarter of a mile from the southern shore of the bay, well sheltered from south-westerly winds.

Chart 1013.

Bank.—A depth of 52 fathoms (95^{m}1), coral, was reported by H.M.S. *Actæon*, in 1862, to lie about 70 miles westward of Saldanha bay in lat. 33° 12′ S., long. 16° 38′ E. In 1927 the German cruiser *Emden* passed over the charted position of this bank, sounding continuously, without obtaining any indication of it; its position must therefore be considered doubtful.

Charts 1236, 1232.

SALDANHA BAY.—This safe and commodious harbour is easy of access; it is entered between North head (*Lat. 33° 03′ S., Long. 17° 55′ E.*) and South head, which is conspicuous and rises to an elevation of 363 feet (110^{m}6) about 3¾ miles south-eastward. Within these points the entrance, which has hills of from 200 feet (61^{m}0) to nearly 400 feet (121^{m}9) high on either side, runs north-eastward for nearly 3 miles where it is contracted to a width of about 2½ miles between Houtjes point, on the northern side, and Eland point, on the southern side. Within these latter points, both of which are fairly steep-to, the bay opens out into an extensive basin, which affords good anchorage at its northern and southern ends to the largest vessels in

Charts 1236, 1232.

considerable numbers. North Bay hill, which is conspicuous, rises to an elevation of 363 feet (110^{m}6), 1¼ miles north-eastward of North head.

North bay is situated on the western side of Houtjes point and its entrance is about one mile wide between that point and North Bay point at its south-western end. Though sheltered from north-westerly winds there is no inducement for vessels to use this bay, as Houtjes bay, situated northward of Houtjes point, is far superior as an anchorage in every respect.

Baviaan point is situated about 12 cables north-north-westward of Houtjes point, and an indentation in the bay formed between these two points is known as The Hole. A conspicuous house is situated on the peninsula, of which Houtjes point is the extremity, about three-quarters of a mile west-north-westward of the point. The town of Saldanha is situated on the north-western shore of Houtjes bay westward and north-westward of Baviaan point. Baviaan point is entirely covered by a large corrugated-iron building with a black chimney in the middle of it.

The land round Saldanha bay is cultivated in many places, and there are many dwelling houses and farm buildings; wheat, barley, and other grain crops are grown.

Port Limits.—The area bounded by the following limits is under the control of the South African Railways Administration. On the North by a line drawn in a 232° direction from Fish point, to a point 3 miles from the shore; on the South by a line drawn in a 232° direction from Latitude 33° 09′ S., Longitude 18° 00′ E., to a point 3 miles from the shore; on the West by a line joining the above points, together with the foreshore therein and all harbour lands vested in the Government of the Union of South Africa.

Islands and dangers in the entrance.—Malagas island (*Lat. 33° 03′ S., Long. 17° 56′ E.*), on which there is a flagstaff, is 23 feet (7^{m}0) high. It is situated on the northern side of the entrance to Saldanha bay, about three-quarters of a mile eastward of Schooner rock, and is one of the Government guano islands, *see* page 19. The island is surrounded by sunken rocks, and at about 2½ cables southward of the summit is a rock with a depth of less than 6 feet (1^{m}8) over it. Shoals with least depths of 18 and 25 feet (5^{m}5 and 7^{m}6) over them are situated about 3½ cables south-westward and south-south-westward, respectively, of the summit. Rocks awash are situated about 2 and 3 cables, respectively, westward of the summit. This island and the rocks surrounding it are covered by a *red* sector of Houtjes Point light, between the bearings of 046° and 146°.

There is a deep narrow passage between the island and the northern shore, but it is unsafe, as the bottom is foul and a heavy swell always sets through it. Vessels should pass at least 4 cables southward of Malagas island.

Needle rock, 17 feet (5^{m}2) high, and surrounded by above-water rocks and reefs, lies about 1½ cables northward of Malagas island.

Barrack rock, with a depth of 2 fathoms (3^{m}7) over it, lies about 3 cables south-eastward of North Bay point.

Jutten island, 119 feet (36^{m}3) high, has on it two hills whitened by guano, and a flagstaff. It is situated on the southern side of the entrance to Saldanha bay, about 2 miles south-eastward of Malagas island, and is one of the Government guano islands, *see* page 19.

Charts 2091, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127.

Charts 1236, 1232.

Rocks extend about 2 cables northward of Jutten island, the northernmost drying at very low spring tides, and others fringe its remaining sides to a distance of nearly one cable from them. Jutten island and all the dangers surrounding it are covered by the *red* sector of Houtjes Point light, between bearings of 326° and 016°.

Between Jutten island and the southern shore, the passage is about 3 cables in width, and the shores on both sides of the channel between the island and the mainland may be approached to a distance of little more than one cable, except in the sandy bay eastward of Jutten island.

Wasserfall bank is a small 9-fathom (16^{m}4) patch, which breaks in heavy gales. It lies about 8½ cables north-westward of Jutten island.

Lloyd bank, on which the depth is 9 fathoms (16^{m}4), lies about half a mile westward of the western extremity of Jutten island.

Passage reef, on which there are depths of from 7½ to 8½ fathoms (13^{m}7 to 15^{m}5), extends in a north-westerly direction for about 3 cables from Jut point, situated about three-quarters of a mile north-north-eastward of South head.

Marcus island (*Lat. 33° 03′ S., Long. 17° 58′ E.*), 24 feet (7^{m}3) high, and on which there is a flagstaff, is situated about 8½ cables south-south-eastward of Houtjes point; it is one of the Government guano islands, *see* page 19. Foul ground extends about 1½ cables off its north-western side, and about one cable off its other sides.

Hospital rock, 20 feet (6^{m}1) high, lies about one cable off the southern extremity of Marcus island; and north-westward of this rock, close to the island, is Black rock, which is 22 feet (6^{m}7) high.

Blink klip, a rock over which there is a depth of 28 feet (8^{m}5), lies about 5 cables north-westward of the flagstaff on Marcus island and 5½ cables southward of Houtjes point. *See* page 299.

Rocks and dangers in the bay.—Lynch blinder, in the eastern part of Saldanha bay, just dries and always breaks. It lies about 9 cables westward of Lynch point, situated 3½ miles east-north-eastward of Eland point. There are depths of from 4 to 7 fathoms (7^{m}3 to 12^{m}8) between Lynch point and the rock, and a 32-foot (9^{m}8) patch exists about one cable south-south-westward from it. Constable hill, *see* page 299, in line with the western extremity of Schapen island, *see* page 298, bearing 175°, leads westward of Lynch blinder.

Seven blinders, in the northern part of the bay, is a small group of rocks, lying about 14 cables north-north-eastward of Houtjes point. A wreck, the hull of which was visible in 1937, lies stranded on Seven blinders. There are depths of 3¾ fathoms (6^{m}9) close-to all round the reef, but a small 3-fathom (5^{m}5) rocky patch lies about half a cable northward of it.

Two rocks, 3 feet (0^{m}9) high, are situated about 1½ cables northward of Baviaan point, and a small group of rocks 2 feet (0^{m}6) high lies 1½ cables further north-eastward. Between these two groups is foul ground.

Dial rock, which is 12 feet (3^{m}7) high, lies close to the northern shore of the bay, about three-quarters of a mile north-eastward of Baviaan point. Two rocks, which dry 3 feet (0^{m}9), lie close inshore about 1¼ miles north-eastward of Baviaan point. Two small islets are situated about a cable westward of Dial rock.

Charts 2091, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127.

Charts 1236, 1232.

Lights.—A light is exhibited, at an elevation of 56 feet ($17^{m}1$), from a white square concrete tower, with a black stripe, on North head.

A light is exhibited, at an elevation of 53 feet ($16^{m}2$), from an iron column on Houtjes point (*Lat. 33° 02′ S., Long. 17° 58′ E.*).

Pilotage.—Pilotage is compulsory for merchant vessels in the area contiguous to the Administration's wharves and in the approaches thereto.

Houtjes bay.—Anchorage.—Houtjes bay is in the northern part of Saldanha bay, and the anchorage in it is well protected by the rocky promontory of granite formation terminating in Houtjes point. Vessels may lie in this bay, in calm water, perfectly sheltered from all directions, at all seasons of the year. The only danger, when rounding Houtjes point, is a small drying rock lying about half a cable north-eastward of it.

A good position in which to anchor is, in a depth of about 5 fathoms ($9^{m}1$), about half a mile northward of Houtjes point, with the western extremity of Marcus island bearing about 175° and open eastward of that point. Vessels of shallow draught may anchor in The Hole, much closer inshore.

Saldanha.—Wharves.—Port facilities.—In 1951 the town of Saldanha had a population of 1,804, of whom 482 were Europeans. The port is controlled by the South African Railways and Harbours Administration.

The Main jetty extends in a north-easterly direction from the southern point of The Hole, and is 600 feet ($182^{m}9$) long and 100 feet ($30^{m}5$) broad, with an extension of 500 feet ($152^{m}4$) long and 42 feet ($12^{m}8$) broad. The overall length of the north face is 1,100 feet ($335^{m}3$). The maximum depth of water alongside is 25 feet ($7^{m}6$), and the average depth 22 feet ($6^{m}7$).

There is usually a very bad scend on the southern side of the jetty which makes it uncomfortable and often impracticable for vessels to lie alongside.

In addition there are 8 other small jetties, mostly on the northern side of Baviaan point (*Lat. 33° 01′ S., Long. 17° 57′ E.*), constructed of wood or stone and ranging from 28 feet to 200 feet ($8^{m}5$ to $61^{m}0$) in length.

There is one 4-ton electric and one mobile steam crane on the Main jetty.

Crayfish canning and whaling are the main industries.

There are two large mooring buoys, capable of holding the largest vessel.

Fresh provisions can be obtained.

Fresh water for all purposes, which is pumped from Berg river, is obtainable.

A stock of coal is available.

Communications.—Saldanha is connected to the general telegraph system.

There is occasional sea communication with Cape Town.

Saldanha is connected by rail with Vredenburg, a town with a European population of 595, in 1951, which is situated about 6½ miles north-north-eastward. There is connection by a single line railway with the General railway system; *see* page 44.

Southern arm of Saldanha bay.—Buoy.—Jetties.—Salamander

Charts 2091, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127.

Charts 1236, 1232.

point is fairly steep-to, and has a depth of 16 feet (4^m9) at about one cable off it. It is situated about 12 cables east-south-eastward of Eland point, on the western side of the entrance, about 2 miles wide, of the narrow southern arm of the bay.

A rock awash is situated about one cable northward of Eland point; about 8 cables eastward of the point, and about one cable offshore, is Boat rock, 8 feet (2^m4) high, with a rock awash inshore of it, and an 8-foot (2^m4) patch about three-quarters of a cable north-north-westward of it.

On the eastern side of the entrance to this arm, depths of less than 3 fathoms (5^m5) extend about 7 cables offshore in the vicinity of Langebaan point, situated 2 miles east-south-eastward of Salamander point, and Middle ground, a shoal on which the depth is 4 feet (1^m2), lies about 4 cables offshore abreast that point. A rock awash lies about 1½ cables northward of Schapen island, situated about 5 cables south-westward of Langebaan point. The south-eastern end of Middle ground is marked by a red can buoy, which however cannot be depended upon.

Chart 1232.

Schapen island (*Lat. 33° 05′ S., Long. 18° 01′ E.*), 46 feet (14^m0) high, is one of the Government guano islands, *see* page 19, and is situated close southward of Middle ground. There is a narrow channel on each side of the island, close southward of which latter the arm of the bay is contracted in width to about three-quarters of a mile between Pofadder point and Perlemoen point on its western side.

The village of Langebaan, which had a population, in 1951, of 577, including 155 Europeans, and off which there is good anchorage for small craft, is situated close northward of Pofadder point, which point is three-quarters of a mile southward of Langebaan point. There is a jetty at this point, with a depth of 10 feet (3^m0) alongside it.

Meuuw island, 24 feet (7^m3) high, and one of the Government guano islands, *see* page 19, is situated near the western shore of this arm, about half a mile north-westward of Schapen island.

A rock awash lies mid-way between Schapen and Meuuw islands, and another lies about half a cable south-eastward of the eastern end of Meuuw island.

Salamander and Donkergat bays.—Lights.—Camp point is situated about 6½ cables south-eastward of Salamander point, and between the two is Salamander bay, in which there is a disused whaling station and a flagstaff. A jetty consisting of a sunken hulk, with a depth of 14 feet (4^m3) alongside it, is situated near the whaling station. The depths in this bay do not exceed 3 fathoms (5^m5).

Two leading lights are exhibited from steel posts on Camp point; when in line they lead to a whaling jetty.

Donkergat bay is situated between Camp point and Meuuw island, and in it is another whaling station, with a jetty about 250 feet (76^m2) long, with a depth of 16 feet (4^m9) alongside it. A shelf, with depths of less than 3 fathoms (5^m5) over it, extends about 5 cables eastward from the shore of Donkergat bay.

Charts 1236, 1232.

Anchorage.—The best anchorage in the southern part of Saldanha bay is, in depths of from 5 to 6 fathoms (9^m1 to 11^m0), about half a mile east-north-eastward of Salamander point, with the western

Charts 1236, 1232.

extremity of Meuuw island bearing 181°, and open eastward of Camp point.

The shelter at this anchorage is not so good as that in Houtjes bay; even with a south-westerly wind the ocean swell penetrates to it, and during strong north-westerly winds the swell is at times very heavy. The tidal stream sets strongly in and out of the southern arm of Saldanha bay, *see* page 300, and frequently holds a vessel at this anchorage broadside on to the swell.

Chart 1232.

The Lagoon.—Southward of Schapen island (*Lat. 33° 05′ S., Long. 18° 01′ E.*), the southern arm of Saldanha bay is known as The Lagoon, and a small stream flows into its head. It is encumbered with shoals and sandbanks, but there are depths of from 9 to 26 feet ($2^{m}7$ to $7^{m}9$) in the channels. Navigation should not be attempted, however, without local assistance. The shores of The Lagoon are rocky and are backed by hills, from 400 to 600 feet ($121^{m}9$ to $182^{m}9$) high, of which the principal on its western side are Postberg (Vlag berg), 630 feet ($192^{m}0$) high, a hill about 3½ cables northward of it, 598 feet ($182^{m}3$) high, and Constable hill, about 1½ miles south-eastward of it, 619 feet ($188^{m}7$) high, of which Postberg and Constable hill are conspicuous. There are several farms and villages on the shores of The Lagoon. Plenty of excellent fish may be caught in the seine, the best place being in Riet bay, westward of Schapen island, where the depths are only 6 or 7 feet ($1^{m}8$ or $2^{m}1$), sand; other places are generally rocky and foul. Fine crayfish can be obtained in any quantity.

Charts 1236, 1232.

Directions.—Vessels intending to enter Saldanha bay will have no difficulties against which to contend once the entrance points have been identified, as there are no detached dangers to avoid and those fringing the islands and points on the mainland will be cleared by keeping the moderate offing which prudence would dictate. In making the approach to this bay, as also in approaching all other places on the western coast of southern Africa, the accuracy of the vessel's latitude is all important before making the land; but when certain of the locality, a course may be shaped to pass between Malagas and Jutten islands, clear of Wasserfall bank, and having passed southward of Marcus island the anchorage in Houtjes bay, or that off the southern arm, may be steered for.

The only dangers in the channel northward of Marcus island are Blink klip and the rock, but by keeping Houtjes point light bearing 040°, until North Head light bears 250°, and is well open northward of Needle rock, and then steering in with those marks astern until Houtjes point bears 001°, Blink klip will be passed in safety, and course may then be shaped for the anchorage.

If intending to anchor in Houtjes bay, vessels should round Houtjes point (*Lat. 33° 02′ S., Long. 17° 58′ E.*), at a distance of about 2 cables, to avoid the sunken rock off it, and anchor as directed on page 297.

Vessels intending to anchor off the southern arm of Saldanha bay should pass Eland point at a convenient distance and take up a berth as directed on page 298.

In approaching Saldanha bay at night, or in thick weather, care should be taken to avoid making the land northward of the entrance

Charts 2091, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127.

Charts 1236, 1232.

to the bay, on account of the numerous rocks that lie off the coast in that direction.

At night, Houtjes Point light showing *white*, between the bearings of 016° and 046°, leads into the entrance to Saldanha bay between Malagas and Jutten islands, and westward of Marcus island and Blink klip.

Current.—Tidal streams.—The tidal streams appear to set fairly in and out of the entrance to Saldanha bay, at the rate of about one knot, but at a short distance outside, the current runs in a northerly direction at the rate of from half a knot to one knot.

During fresh southerly winds, a strong northerly current appears always to run between Schapen island and Pofadder point, to avoid which, boats proceeding from the anchorage to the village of Langebaan should keep westward of the island.

Strong tidal streams run in and out of The Lagoon, and the outgoing stream attains a rate of 3 knots at springs.

Inside The Lagoon, when the tidal stream and wind are against each other, a nasty sea gets up, but there is excellent shelter for boats and whaling craft in the small bays in its shores.

Chart 1232.

SOUTH HEAD TO TABLE BAY.—Coast.—Jetty.—Stony head, which is 298 feet (90^{m}8) high and is conspicuous, is situated about 2 miles south-south-eastward of South head, and between them is Kreeft bay, the entrance to which is about one mile wide, but being open westward, it affords no shelter. A reef of rocks, on which the sea usually breaks, extend about 4 cables seaward from Stony head.

Vondeling island, 31 feet (9^{m}4) high, is situated about half a mile offshore, about one mile south-eastward of Stony head. It is one of the Government guano islands, *see* page 19, and is fringed with rocks, which, off its western extremity, extend about one-quarter of a mile. A 37-foot (11^{m}3) patch, which breaks in bad weather, lies about 4 cables north-westward of its western extremity.

Rocks with depths of less than 6 feet (1^{m}8) over them extend nearly 1½ cables north-eastward of the north-eastern extreme of the island. An islet, 23 feet (7^{m}0) high, with rocks on its northern and southern sides, lies close inshore about 3½ cables north-eastward of Vondeling island.

The coast, from Stony head to a position abreast Vondeling island, rises to a chain of small hills from 160 to 300 feet (48^{m}8 to 91^{m}4) high.

Charts 1232, 2091.

From abreast Vondeling island (*Lat. 33° 09′ S., Long. 17° 59′ E.*), the coast recedes slightly, and thence extends south-south-eastward for about 14 miles, as far as Yzerfontein point; it consists of a straight, sandy beach backed by sand dunes, rising to a height of about 200 feet (60^{m}8) in places.

The sand dunes extend inland to a distance of over one mile and are prominent. These dunes are being formed by drifting sand, and they are rapidly extending eastwards over the land.

Black rock, 2 feet (0^{m}6) high and about 3 cables offshore, is situated about 1¾ miles south-eastward of Vondeling island.

Chart 2091.

Yzerfontein point is a rocky, rounded, salient point at the southern

Charts 2091, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127.

Chart 2091.

end of the above-mentioned stretch of sandy coast, *see* view on chart 2091. A reef of rocks fringes the point, close eastward of which, and forming the highest part of the ridge inshore of the point, is Yzerfontein hill, which is conical and 280 feet (85^{m}3) high.

Meuuw rock lies about 3 cables northward of Yzerfontein point, and is 34 feet (10^{m}4) high.

In 1950, a breakwater was completed which extends for a distance of 600 feet (182^{m}9) in a northerly direction from the northern side of Yzerfontein point. A jetty, 200 feet (61^{m}0) in length, with depths of 15 feet (4^{m}6) alongside, has been constructed within the breakwater.

From Yzerfontein point, the coast trends south-south-eastward for about 15 miles to Bok point (page 303), forming an open sandy bay. The mouth of the Modder river, a small stream, is situated about 11½ miles south-eastward of Yzerfontein point, and close southward of it are Black rocks, two islets close inshore.

There is good landing during moderate weather in the southern end of Jacob's cove, about 3 miles northward of Bok point, the landing being sheltered from the prevailing swell by a rocky ledge.

Off-lying danger.—Rondeberg breaker is a dangerous sunken patch over which the depth is 27 feet (8^{m}2), lying 2 miles offshore, about 8 miles south-south-eastward of Yzerfontein point. There are depths of from 18 to 20 fathoms (32^{m}9 to 36^{m}6) close outside this danger, and from 17 to 12 fathoms (31^{m}1 to 21^{m}9) between it and the breakers lining the coast, which latter at this point extend slightly farther seaward than off the rest of the coast. Excepting Rondeberg breaker, there are no dangers in the channel between Dassen island and the mainland.

Dassen island.—**Anchorages.**—This island, 63 feet (19^{m}2) high, is situated about 5 miles south-westward of Yzerfontein point, and is one of the Government guano islands, *see* page 19. The island, though principally covered with sand, is based on rock, and is fringed on its northern, western, and southern sides by dangerous reefs, some of which extend as much as 1½ miles offshore. *See* view on chart 1232.

West ledge, which is always above water, is situated about one mile south-westward of Dassen island, and between them lie The Triangles, a dangerous reef of foul ground. Roaring Sister (*Lat. 33° 27′ S., Long. 18° 06′ E.*), two rocks with depths of less than 6 feet (1^{m}8) over them, lie about 1¼ miles south-south-eastward of Dassen island light-structure; South rock, with depths of 6 fathoms (11^{m}0) over it, lies close southward of Roaring Sister.

Spout rock, a remarkable hollow rock, lies on the western side of the island; in heavy weather, the sea is forced through the orifice to the height of about 100 feet (30^{m}5), and can plainly be seen over the island from a vessel at anchor on its eastern side.

The eastern side of Dassen island is clear of dangers, and good anchorage may be obtained, off Waterloo bay, in depths of from 10 to 14 fathoms (18^{m}3 to 25^{m}6), sand and mud, at a distance of from 4 to 5 cables offshore, abreast the middle of the island.

Chart 2091, plan of House bay.

House bay, at the north-eastern end of the island, lies between Boom point, the north-western extreme of the island, and the north-eastern extreme of the island, about 7 cables eastward. A conspicuous rock lies about 2¼ cables south-south-eastward of Boom point.

Chart 2091, plan of House bay.

Breakers extend for about 2 cables northward from both entrance points.

Depths of under 3 fathoms ($5^{m}5$), with patches of foul ground, extend about 2 cables from the head of the bay. A detached rocky patch, with a depth of 7 feet ($2^{m}1$) over it, lies about 3½ cables northward of a flagstaff and some houses near the head of the bay.

Small vessels can obtain anchorage, in a depth of about 10½ fathoms ($19^{m}2$), in House bay with the flagstaff at the head of the bay bearing about 173° and the conspicuous rock bearing about 248°. This anchorage is unsafe during north-westerly winds.

Chart 2091.

Light.—A light is exhibited, at an elevation of 155 feet ($47^{m}2$), from a circular iron tower, 80 feet ($24^{m}4$) in height, painted with red and white horizontal bands, situated near the southern end of Dassen island; there is a dwelling about 60 yards ($54^{m}9$) eastward of the lighthouse. *See* sketch on chart 2091.

Off-lying dangers.—South West breakers are two sunken rocks on which the sea breaks heavily during and after bad weather; the least known depths over them are 33 feet and 36 feet ($10^{m}1$ and $11^{m}0$), and they lie about 3½ miles south-south-westward and southward, respectively, of Dassen Island lighthouse. Both rocks are steep-to.

From the north-western of these two breakers, the bottom is very irregular for nearly one mile in the direction of Dassen island, the depths varying from 10 to 20 fathoms ($18^{m}3$ to $36^{m}6$), causing a confused and dangerous sea in bad weather.

Southward of South West breakers, about 5 miles south-south-westward of Dassen Island lighthouse, lies Protea rock with a depth of 36 feet ($11^{m}0$) over it, and depths of under 20 fathoms ($36^{m}6$) at a distance of about 3 cables from it.

A depth of 62 feet ($18^{m}9$) exists about 1¾ miles southward of Protea rock.

Although a vessel should be able to ascertain her position by bearings of Dassen Island light (*Lat. 33° 26′ S., Long. 18° 05′ E.*), it is necessary to exercise great caution when in the vicinity of that island, especially at night, as the reefs are steep-to and the positions of the rocks are not always marked by breakers. There are depths of 40 and 90 fathoms ($73^{m}2$ and $164^{m}6$) at about 5 and 10 miles, respectively, westward of the island, and it is advisable to keep in depths of not less than 45 fathoms ($82^{m}3$).

Currents.—Between Saldanha and Table bays, an eddy current sets southward at a distance of from 4 to 5 miles offshore during the winter months of June, July, and August; at a short distance outside this eddy, the current is almost constant throughout the year, its general direction is between north and north-west, or parallel with the coast, and it attains a rate of from half a knot to one knot, though between Table bay and Dassen island it sometimes runs at over 2 knots.

This current sometimes has a tendency to set a vessel towards the coast, especially during or after strong onshore winds and should therefore be carefully guarded against. From time to time, however, reports have been received from vessels approaching from northward, to the effect that when abreast the coast between Saldanha and Table bays, the normal northerly set has not been evident, but that on the

Charts 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127.

Chart 2091.

contrary, a southerly set has been experienced, sometimes towards and sometimes away from the land.

In February, 1930, H.M.S.A.S. *Protea* experienced this southerly set for the first time after having made nearly fifty passages in the preceding two years. On this occasion the set of the current was 174° and the rate 0·7 knots; there was a thick fog at the time with a light northerly wind.

Coast.—Bok point, *see* page 301, is rocky and fringed with reefs; a rock, with a depth of less than 6 feet which usually breaks, lies about half a mile westward of the point, and the land in its immediate vicinity is hilly, rising inland to considerable heights. Kapokberg, 10 miles north-eastward of the point, is 1,503 feet (458$^{\mathrm{m}}$1) high; Dassenberg, 11 miles east-north-eastward of Bok point, is 1,857 feet (566$^{\mathrm{m}}$0) high; and Katzenberg, a well-defined, isolated, conical hill, about 12 miles eastward of the point, is 1,368 feet (417$^{\mathrm{m}}$0) high.

Matroos point (*Lat. 33° 37′ S., Long. 18° 22′ E.*), situated about 4½ miles south-eastward of Bok point, is 181 feet (55$^{\mathrm{m}}$2) high. Between these points are two bays, separated by a rocky tongue of land fringed with reefs. Buffels river flows into the southern part of Buffels bay, the northern part of which is known as Bok bay. Matroos bay, the southern of the two, being open to south-westerly winds, affords no shelter and is seldom used as an anchorage.

From Matroos point, a low, sandy coast trends south-south-eastward for about 7½ miles to Melkbosch point, and the depths offshore are very regular, there being from 7 to 11 fathoms (12$^{\mathrm{m}}$8 to 20$^{\mathrm{m}}$1) at a distance of about one mile from the coast.

Seal ledges, a rocky patch rising to about 8 feet (2$^{\mathrm{m}}$4) above high water, lie about 2 miles south-eastward of Matroos point, and are about half a mile offshore; there are submerged patches of rock at the same distance offshore, for about one mile both northward and southward of Seal ledges. There are depths of from 3 to 8 fathoms (5$^{\mathrm{m}}$5 to 14$^{\mathrm{m}}$6) inshore of these rocks.

Chart 1920.

Blaauwberg river enters the sea about 1¼ miles north-north-eastward of Melkbosch point; some rocks awash lie about 3 cables west-south-westward of the entrance. Melkbosch point is 72 feet (21$^{\mathrm{m}}$9) high, and is fringed with rocks close inshore.

From Melkbosch point the coast trends in a general south-south-easterly direction, and forms the eastern side of Table bay, *see* page 306.

The village of Melkboschstrand, situated near Melkbosch point, and the village of Blaauwbergstrand, about 4 miles southward of that point, are conspicuous from seaward. Both villages are seaside resorts, and a few fishing boats operate from them. Landing is only practicable and safe in fine weather, and should not be attempted without local knowledge except in emergency. Reefs extend three-quarters of a mile north-westward from Blaauwbergstrand, and up to half a mile offshore.

Blaauwberg (*Lat. 33° 45′ S., Long. 18° 28′ E.*), situated about 2 miles south-eastward of Melkbosch point, and 1¼ miles inland, is a conspicuous, dark, rounded hill, 745 feet (227$^{\mathrm{m}}$1) high.

Charts 636, 2091.

Tygerberg hills, 1,357 feet (413$^{\mathrm{m}}$6) high and about 6 miles in length, lie parallel with the coast southward of Blaauwberg and about 5 miles

Charts 636, 2091.

inland. These with Blaauwberg and Olifant's kop, 1,234 feet (376^{m}1) high and situated about 6½ miles eastward of Melkbosch point, are the only conspicuous hills in the neighbourhood of Table bay, northward of Table mountain, *see* view on chart 2091.

Chart 1920.

Robben island.—This island is situated with its northern extremity about 4¾ miles south-westward of Melkbosch point; with its light, it forms an admirable landmark when approaching Table bay from northward. It is low, flat and fringed by reefs, which on its western side project about one or 2 cables offshore. Rocky ground, over which the depths range from 4¾ to 11 fathoms (8^{m}7 to 20^{m}1), extends westward from the island for from one-half to three-quarters of a mile. This rocky ground rises suddenly from depths of from 25 to 30 fathoms (45^{m}7 to 54^{m}9), and the sea breaks heavily on it during strong onshore winds.

The north-eastern side of the island is free from dangers, but its eastern and southern coasts are fronted by rocky ground, marked by seaweed, with irregular depths over it of from 2 to 4 fathoms (3^{m}7 to 7^{m}3), for a distance of from 2 to 4 cables offshore.

Depths of 5 fathoms (9^{m}1) lie at a distance of from 4 to 7 cables from the eastern and southern sides of the island.

The navigable channel eastward of Robben island lies between the 5-fathom (9^{m}1) line off Robben island and the 7-fathom (12^{m}8) line off Blaauwbergstrand. Care must be taken to avoid the reefs lying north-westward of Blaauwbergstrand which are described on page 303.

Dangers.—Whale rock, lying about one mile south-south-eastward of the southern extremity of Robben island, usually breaks; it has a depth of less than 6 feet (1^{m}8) over it. The rock is covered by the *red* sector of Robben island light between the bearings of 340° and 351°.

Between the rock and the island there is a passage in the fairway of which the depths are from 5¼ to 7 fathoms (9^{m}6 to 12^{m}8), over a rocky bottom; but this channel should never be attempted by low-powered vessels, except in a case of emergency, as the currents in the vicinity of the rock are sometimes strong and uncertain in their directions.

A rock, marked by kelp and on which the depth is about 8 feet (2^{m}4), lies about 2 cables east-north-eastward of the head of the jetty at the south-eastern end of Robben island (page 305).

There are several detached shoals with depths over them of from 31 to 33 feet, about one mile north-eastward, eastward, and south-eastward, respectively, from this same jetty.

Light.—Fog signal.—Radiobeacon.—A light is exhibited, at an elevation of 154 feet (46^{m}9), from a white circular tower, 60 feet (18^{m}3) in height, situated on Minto hill near the southern end of Robben island (*Lat. 33° 49′ S., Long. 18° 22′ E.*).

A fog signal is sounded from a station near the centre of the western side of Robben island. A radiobeacon transmits from the lighthouse.

Robben Island lighthouse is in telephonic communication with Cape Town.

Life-saving.—A line-throwing apparatus is maintained on Robben island.

Anchorage.—Fair anchorage, sheltered from south-westerly to

Charts 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 1920.

west-north-westerly winds, may be obtained off the north-eastern side of Robben island. The best position for a vessel of moderate draught is with the south-eastern extremity of Robben island bearing 213°, and the northern extremity of the island bearing 293°; in this position the depths are from 7 to 8 fathoms ($12^{m}8$ to $14^{m}6$), sand. Smaller vessels will find excellent shelter, nearer the island, in depths of from 5 to 6 fathoms ($9^{m}1$ to $11^{m}0$), but closer in the bottom is rocky.

There is a jetty on the south-eastern side of Robben island, but landing is difficult at times owing to the swell: good landing may be obtained in Murray's bay, on the north-eastern side of the island, with depths of 13 feet to 15 feet ($4^{m}0$ to $4^{m}6$), alongside the quay. Depths of 13 feet ($4^{m}0$) exist off the entrance to the harbour.

Robben island is under the control of the Union Defence Force. Permits are required to land.

Charts 636, 1920.

CAPE PENINSULA.—Aspect.—Table mountain.—(A description of the Cape peninsula, Table bay, False bay and Simons bay is also contained in Africa Pilot, Volume III.) The Cape peninsula is a remarkable promontory extending in a southerly direction for about 28 miles from Green point at its northern end to the Cape of Good Hope (*Lat. 34° 21′ S., Long. 18° 28′ E.*) its southern extremity. It is connected to the mainland on its north-eastern side by a neck of low-lying land, about 11 miles wide between the head of Table bay and False bay. In height, the peninsula varies from 3,563 feet ($1{,}086^{m}0$) at Table mountain, 3,045 feet ($928^{m}1$) at Constantiaberg, both in its northern portion, and 2,225 feet ($678^{m}1$) at Zwartkop, in its southern part, to but a few feet near its centre where a valley, which is only visible on certain bearings, extends from Chapmans bay, on its western side, to Fishhoek bay, on its eastern side.

The Cape peninsula is rocky and barren, with a growth of stunted trees here and there. Large areas, however, have been planted with pine and other trees, and with the fertile valleys in the vicinities of Constantia and Wynberg, on its eastern side, are pleasing exceptions. From westward, the peninsula appears high and rugged from Table mountain to within 4 miles of the Cape of Good Hope, where the mountain chain terminates in Paulsberg, 1,210 feet ($368^{m}8$) high and situated close to the western shore of False bay (page 318). From Paulsberg to Cape point, the south-eastern extremity of the Cape of Good Hope, the land is elevated and, except for two peaks at its southern end, is even; these two peaks appear, when seen from a considerable distance, as a saddle-shaped island. *See* views on chart 636.

Table mountain (*Lat. 33° 58′ S., Long. 18° 25′ E.*) is a remarkable and gigantic mass of quartzose sandstone at the northern end of the peninsula, immediately overlooking Cape Town at the head of Table bay. The mountain, which rests on a granite base, 500 feet ($152^{m}4$) high, has a level summit from which its north-eastern side falls almost perpendicularly to a gap which separates it from Devil's peak, a rugged mountain, 3,281 feet ($1{,}000^{m}0$) high. Eastward of these two mountains lies the low sandy isthmus between Table and False bays. The north-western side of Table mountain also falls nearly perpendicularly from its summit, and then slopes steeply to the base of Lion's Head,

Charts 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Charts 636, 1920.

a conical mountain, 2,193 feet (668^{m}4) high, which in some places is so steep that it can only be ascended by steps cut in the rock; *see* views facing pages 310 and 311.

There is an aerial cableway, connecting an upper and lower station, on the north-western side of Table mountain; the upper station, situated about 1½ miles south-south-westward of Lion's Head, is conspicuous.

From the northern side of Lion's Head, a rounded ridge extends about 1¼ miles in a north-easterly direction to Lion's Rump, which has a flagstaff and two masts on its summit, where it rises again to an elevation of 1,153 feet (351^{m}4). *See* views facing pages 310 and 311, and on chart 2091.

The Twelve Apostles is a high, serrated, mountainous ridge from 2,400 to 3,000 feet (731^{m}5 to 914^{m}4) high, extending in a south-south-westerly direction from the south-western side of Table mountain towards Hout bay, on the western side of the peninsula. This ridge presents a steep precipitous face seaward and ends at a remarkable conical hill, 1,430 feet (435^{m}9) high, named Little Lion's Head, which is similar in appearance to Lion's Head, but has a very conspicuous white sandpatch showing both northward and southward over Hout bay. At about 2 miles farther south-south-westward a lofty rugged hill, named Karbonkelberg, rises to an elevation of 2,144 feet (653^{m}5), and is separated by a saddle shaped ridge from Hangberg, a remarkable hill, 1,087 feet (331^{m}3) high, which overhangs the western entrance point of Hout bay, *see* page 314.

Local Magnetic Anomaly.—A local magnetic anomaly, details of which are lacking, has been reported, from time to time, off the Cape peninsula.

Chart 1920.

TABLE BAY.—Lights.—This bay is situated on the northern side of the neck of Cape peninsula, and affords shelter for a large number of vessels, with fair security during the summer months October to April; *see* also page 308.

The coast, from abreast Blaauwberg (*Lat. 33° 45′ S., Long. 18° 28′ E.*) (page 303), southward, consists of a series of sand dunes, from 50 to 150 feet (15^{m}2 to 45^{m}7) high, which are sparsely covered with scrub and low bush.

For about the first 3 miles it is fringed with rocks and breakers, which, abreast the village of Blaauwbergstrand, extend about 4½ cables offshore. Southward of these rocks, the coast forming the eastern side of Table bay curves south-south-eastward and then south-south-westward for about 8 miles to the mouth of Salt river. The whole of this part of the coast is very deceptive, particularly at night or in hazy weather, owing to the close resemblance which the sandy shore bears to the sea.

A wreck, with parts of the hull showing, lies close offshore about 13 cables northward of the mouth of Diep river, situated about 2 miles north-eastward of the mouth of Salt river; and a similar wreck lies close offshore, about 3½ cables north-eastward of the mouth of Salt river.

The masts of the radio station at Milnerton, which are 300 feet (91^{m}4) high, are situated about 1½ miles north-eastward of the mouth

Charts 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127.

Chart 1920.

of Diep river, and are conspicuous. Red lights are exhibited from the tops of these masts.

A conspicuous building is situated 3 cables east-north-eastward of the mouth of Salt river. A conspicuous tower, part of Groote Schuur hospital, is situated 14 cables southward of the mouth of Salt river.

From the mouth of Salt river, the shore of Table bay sweeps round westward and north-westward to Mouillé point, and on it is situated the city of Cape Town with its docks, etc.

Granger bay is contained between Mouillé point and the breakwater, 6 cables eastward.

Green point (*Lat. 33° 54′ S., Long. 18° 24′ E.*), is situated about three-quarters of a mile westward of Mouillé point, and from it shoal water extends about 2 cables in a north-westerly direction.

The outer end of a sewage outfall, which extends in a north-westerly direction for about 2¼ cables from the shore, is situated about 3 cables north-north-westward of Green point.

Cautions.—*Cable.*—Vessels are warned not to anchor between two pecked lines shown on chart 1920, extending in a 316° direction from Green point, owing to the existence of submarine cables; *see* page 39.

Charts 1920, 636.

Dumping Ground.—Hulks have been sunk and explosives dumped within a radius of 4 miles of a position about 5½ miles south-westward of Robben island; vessels are cautioned against anchoring or trawling in this area which is indicated by pecked lines on the chart.

Chart 1920.

Dangers.—Buoyage.—The coast between the mouths of Diep and Salt rivers is fronted in places by foul ground on which the sea breaks heavily after north-west gales. Shoals, with depths of 25 to 35 feet (7^{m}6 to 10^{m}7) over them, lie between 6 and 9½ cables north-westward to west-south-westward of the entrance to Diep river.

Midway between the mouths of Diep and Salt rivers, depths of 6 fathoms (11^{m}0) exist, in some cases more than 5 cables offshore.

A rocky shoal of small extent, with a depth of 27 feet (8^{m}2) over it, lies about 8 cables northward of the mouth of Salt river and 6 cables offshore; a red can buoy is moored close northward of the shoal.

A shoal, with a depth of 35 feet (10^{m}7) over it, lies about 4½ cables farther north-westward.

Charts 123, 1920.

A rocky shoal, with a depth of 37 feet (11^{m}3) over it, lies in the approach to Victoria basin about 7 cables east-north-eastward of the light-structure on the head of Table Bay breakwater (*Lat. 33° 54′ S., Long. 18° 26′ E.*); vessels should avoid this position especially in bad weather and heavy swells. A light-and-bell-buoy, exhibiting a *white occulting* light *every four seconds*, light *two seconds*, eclipse *two seconds*, is moored about one cable westward of this shoal and 6½ cables east-north-eastward of the head of Table Bay breakwater; an automatic bell, giving *four* strokes *every minute*, is sounded from the buoy. Vessels may pass on either side of this buoy having due regard to the depths on this shoal and the state of the swell.

Depths of less than 6 fathoms (11^{m}0) lie to the eastward of a position about 7½ cables east-south-eastward of the head of the breakwater.

A patch, with a depth of 35 feet (10^{m}7) over it, lies in a position 7¼ cables south-eastward of the head of the breakwater.

Charts 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127.

Chart 1920.

Lights.—Fog signal.—A light is exhibited, at an elevation of 65 feet ($19^{m}8$) from a square tower, the top part of which is painted black with a yellow band, yellow dome, and the lower part grey, 52 feet ($15^{m}8$) in height, situated on Green point.

A fog signal is sounded from Green Point lighthouse.

A light, for the use of aircraft, at an elevation of 107 feet ($32^{m}6$), is occasionally exhibited at Cape Town air port, situated about 2½ miles south-south-eastward of the radio station at Milnerton.

Caution.—Vessels approaching Table bay are warned that *red* and *green* robot traffic lights may be visible from seaward in the Sea Point and Three Anchor Bay areas, and care should be taken not to mistake these lights for navigational aids.

Tidal stream.—Current.—There is no sensible tidal stream either in Table bay or off the adjacent coast.

A current varying from half a knot to 2 or 3 knots, sets northward past Table bay and Robben island (*Lat. 33° 49′ S., Long. 18° 22′ E.*), but during the winter months, when north-westerly winds prevail, a current sets into Table bay from north-westward and impinging on the south-eastern shore of the bay, about the mouth of the Salt river, divides into two streams, the one setting northward along the coast and out between the Robben island and the coast westward of Blaauwberg, while the other takes a westerly direction as far as Eastern mole of Duncan basin, then northerly, sweeping the south-western shore of the bay.

During the summer season it has been observed, particularly during South-Easters, that a weak current sets round Mouillé point south-eastward into the bay, and out abreast the coast westward of Blaauwberg as in winter, *see* also page 302.

Anchorage.—Vessels anchoring in Table bay must do so clear of the entrances to Victoria basin and Duncan dock. During the winter months, from April to September, when northerly and north-westerly winds prevail, there is no safe anchorage in the bay, and it should only be used by vessels prepared to proceed to sea at short notice on the approach of bad weather.

Vessels anchoring in the bay during the summer months, October to March, should anchor to the eastward of the end of the breakwater, as South-Easterly winds reach gale force, and vessels, particularly light draught vessels, may drag their anchors.

Vessels at anchor should at all times have their main engines ready at short notice.

Charts 123, 1920, 636.

Directions.—*Steam vessels.*—By night, from northward, a vessel should pass about 2½ miles westward of Robben Island light (*Lat. 33° 49′ S., Long. 18° 22′ E.*), and steer for the light near the outer end of the breakwater, bearing about 132°, which leads about one mile south-westward of Whale rock.

The end of the breakwater should be rounded at a distance of not less than 3 cables, and thence a vessel may proceed into either of the basins or to the anchorage south-eastward of the breakwater.

From southward, vessels should pass Slangkop point, *see* page 315, at a distance of about 5 miles and should not bring the light on that point to bear more than 154° until Robben Island light bears 023°,

Charts 123, 1920, 636.

when this latter may be approached on that bearing; this light will be seen before the light on Green point. When Green point light bears 063° course may be altered to pass at least 1¼ miles northward of Green and Mouillé points; after passing the latter point, a vessel may steer so as to round the outer end of the breakwater at a distance of not less than 3 cables, and thence proceed into either of the basins or to the anchorage south-eastward of the breakwater.

Caution.—At night or in hazy weather, vessels standing into the bay should never fail to sound. For want of this precaution vessels have run upon Green and Mouillé points without seeing land, whilst their masts were seen over a fog from the elevated ground at the foot of Lion's Rump. The fogs that obscure the light are frequently confined to the low ground in the vicinity of Green and Mouillé points, extending upwards only from 100 to 150 feet ($30^{m}5$ to $45^{m}7$). In these circumstances it is advisable to have a mast-head man aloft, who will probably see land when it is invisible from the deck.

Pilotage.—The employment of a pilot is compulsory for merchant vessels when entering, leaving, or shifting berth in the basins or docks at Cape Town.

Charts 123, 1920.

Port limits.—The area bounded by the following limits is under the control of the South African Railways and Harbours Administration, *see* page 45.

On the west by a line joining Green Point and Robben Island lighthouses. On the north by a line drawn 090° from Robben Island lighthouse to the shore of Table bay, thence southward along high water mark so as to include the foreshore to the Castle, and thence back to Green Point lighthouse, together with the foreshore, wharves, docks, basins, jetties, piers, harbour works, and all harbour and dock lands vested in the Government of the Union of South Africa.

Chart 123.

Breakwater.—Light.—Fog signal.—A breakwater projects from a position on the coast about half a mile south-eastward of Mouillé point; it extends in a north-easterly and east-north-easterly direction for about three-quarters of a mile.

A light is exhibited at an elevation of 46 feet ($14^{m}0$) from a steel framework structure near the head of the breakwater (*Lat. 33° 54′ S., Long. 18° 26′ E.*).

A fog signal is sounded from a station near the head of the breakwater.

Signal station.—A signal station, about 130 feet ($39^{m}6$) high, is situated on the top of the silos or bins of the grain elevator above No. 1a or Cross berth, at the south-western end of Victoria basin, *see* below. It is equipped for semaphore and flag signalling by day, for morse signalling at night, and is also fitted with radio. Constant watch is kept, and the station is in telephonic communication with the Port Captain's office.

Victoria basin.—Lights.—This basin is protected on its northern side by the breakwater and by East pier, which extends at right angles to the former from a position about 600 yards ($548^{m}6$) from its root. On its southern and eastern sides, it is enclosed by South arm and South Arm elbow (*Lat. 33° 54′ S., Long. 18° 26′ E.*). The

Charts 636, 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 123.

entrance, between the heads of East pier and South Arm elbow, is about 250 feet (76^{m}2) wide.

Two lights, disposed vertically, are exhibited at elevations of 22 and 18 feet (6^{m}7 and 5^{m}5) respectively, from a framework mast on a concrete pillar, on each side of the entrance to Victoria basin.

The depths in the basin varied, in 1951, from about 37 feet (11^{m}3) in the entrance, to 10 feet (3^{m}0) at No. 4 quay.

In 1951, Victoria basin, which has an area of 67 acres, contained a total length of quayage of 9,405 feet (2,866^{m}6) and consisted of the following.

No. 1 jetty projects at right angles to the south-eastern side of the breakwater near its root, and is a wooden structure with depths of from 20 to 23 feet (6^{m}1 to 7^{m}0) on its south-western side, and from 18 to 20 feet (5^{m}5 to 6^{m}1) on its north-eastern side.

No. 2 jetty projects at right angles to the south-eastern side of the breakwater, about mid-way between No. 1 jetty and the East pier; it has depths alongside of from 35 to 37 feet (10^{m}7 to 11^{m}3), and is equipped for the discharge of fuel oil from tank vessels.

The Collier jetty projects in a north-easterly direction from the land in the south-western corner of the basin, and has depths of from 24 to 32 feet (7^{m}3 to 9^{m}8) on its south-eastern side, and from 20 to 31 feet (6^{m}1 to 9^{m}4) on its north-western side. This jetty is equipped, on its south-eastern side, with appliances for loading grain in bulk.

The Fish quay extends north-north-westward from the root of Collier jetty, for a distance of 310 feet (94^{m}5), and has a least depth of 8 feet (2^{m}4).

South Arm quay is the north-western side of South pier, and has depths alongside of from 26 to 31 feet (7^{m}9 to 9^{m}4).

Elbow quay is the south-western side of the arm at right angles to South arm, and has depths alongside of from 32 to 34 feet (9^{m}7 to 10^{m}4).

This quay is equipped for the discharge of petrol and oil from tank vessels.

No. 4 quay, at the north-western end of the south-western side of the basin, is in two sections and has a depth alongside of 10 feet (3^{m}0).

No. 5 quay, between No. 4 quay and No. 1 jetty, has a depth alongside of from 14 to 23 feet (4^{m}3 to 7^{m}0).

No. 6 quay, between Nos. 1 and 2 jetties, has depths alongside of from 27 to 34 feet (8^{m}2 to 10^{m}4).

No. 7 quay, between No. 2 jetty and East pier, has depths alongside of 37 feet (11^{m}3).

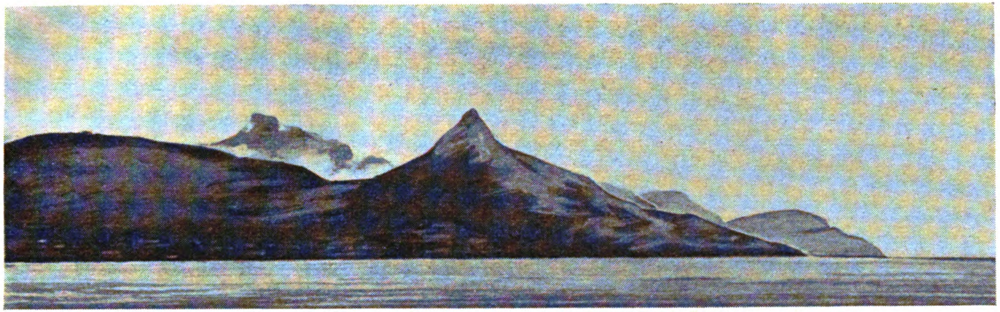
East Pier quay, on the south-western side of East pier (*Lat. 33° 54′ S., Long. 18° 26′ E.*), has depths alongside of 35 feet (10^{m}7).

The Cross Berth wharf, between the Collier jetty and the south-western end of the South arm, has depths alongside of from 20 to 21 feet (6^{m}1 to 6^{m}4).

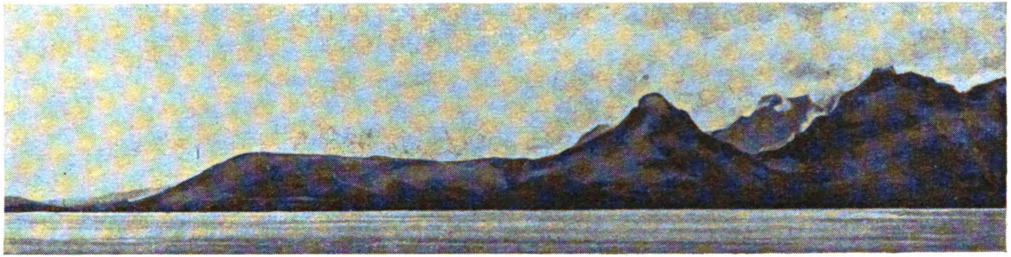
Alfred basin.—The entrance to this basin, 90 feet (27^{m}4) wide, is situated nearly in the centre of the south-western side of Victoria basin. The depths in Alfred basin vary from 21 feet (6^{m}4) at its entrance to between 18 and 24 feet (5^{m}5 and 7^{m}3) within it.

The area of Alfred basin is 8½ acres, with a total length of 2,632 feet (802^{m}3) of wharfage.

Charts 1920, 636, 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

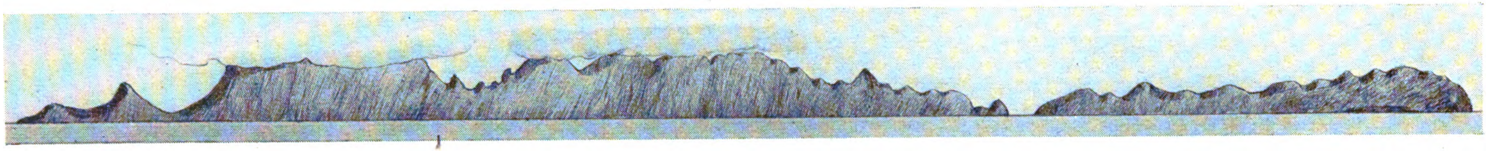

Lion's Rump.
Table mountain (summit obscured).
Lion's Head, bearing 191°, distant 3 miles.

Northern end of Cape peninsula from northward.
(*Original dated* 1918.)


Lion's Rump.
Lion's Head, bearing 138°, distant 4 miles.
Table mountain (summit obscured).

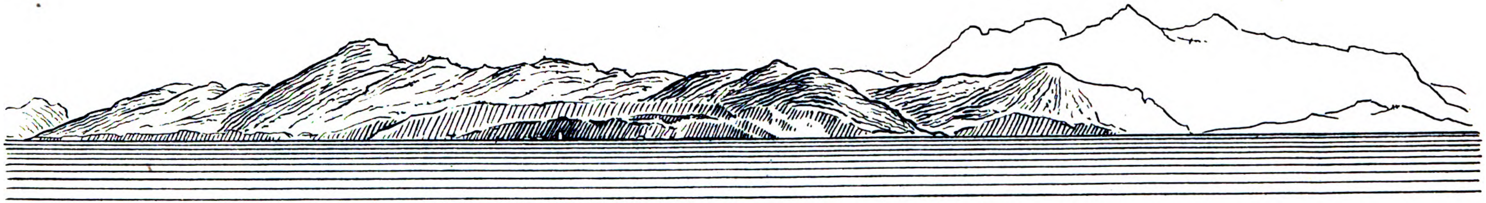
Northern end of Cape peninsula from westward.
(*Original dated* 1918.)

To face page 311.


Lion's Rump.
Lion's Head.
Table mountain (summit obscured), bearing 079°, 23 miles.
Twelve Apostles.
John.
Little Lion's Head (obscured), bearing 086°.
Chapmans peak.
Little Slangkop.
Slangkop point, bearing 111°.

Northern end of Cape peninsula from westward.

(*Original dated* 1920.)


Peak 1,200 feet.
Slangkop lighthouse, bearing 099°, distant 8·2 miles.
Conspicuous sand patch.

Slangkop point and adjacent coast.

(*Original dated* 1936.)

Chart 123.

West quay is on the western side of the basin and has depths alongside of from 22 to 24 feet (6^{m}7 to 7^{m}3). The floating dock lies alongside the northern portion of this quay, *see* page 312.

North quay is on the northern side of the basin and has depths of 24 feet (7^{m}3) alongside. The entrance to Robinson dry dock lies close westward of North quay, *see* page 312.

South quay, on the southern side of the basin, has a depth alongside of 18 feet (5^{m}5).

East quay is on the eastern side of the basin and is in four sections, Nos. 1, 2, 3 and 4, and has a depth alongside of from 19 to 23 feet (5^{m}8 to 7^{m}0).

Duncan basin. — Lights. — Depths. — Berths. — Duncan basin, south-eastward of Victoria basin, is an enclosed area of 290 acres, about one mile in length and 3½ cables in width, with a total quayage of 12,643 feet (3,853^{m}6), in 1951.

The entrance, which is 400 feet (121^{m}9) wide, is situated near the northern end of its north-eastern side.

A light is exhibited at an elevation of 26 feet (7^{m}9) on each side of the entrance.

The depths in the basin vary from about 40 feet (12^{m}2) in the entrance to 21 feet (6^{m}4) at the south-eastern end of the Eastern mole and at the entrance to the Yacht basin.

Berths A, B and C in the northern corner had depths of 38 feet (11^{m}6) alongside. Berth D at the south-western end of South arm has depths of 34 to 38 feet (10^{m}4 to 11^{m}6). Berths C and D are equipped for the discharge of petrol and oil from tank vessels.

Berths E to L, on the south-western side of the basin, have depths of 42 to 34 feet (12^{m}8 to 10^{m}4) alongside.

Berth M, at the south-western end of the south-eastern side of the basin, has a depth of 21 feet (6^{m}4).

Nos. 1 to 5 berths, on the inside of New Eastern mole, are dredged to depths of between 21 to 34 feet (6^{m}4 to 10^{m}4).

The entrance to Sturrock Graving dock (*Lat. 33° 55′ S., Long. 18° 27′ E.*), *see* below, lies at the south-eastern side of Duncan basin, and close south-westward of this is the entrance to the Yacht basin which has depths of between 14 and 20 feet (4^{m}3 and 6^{m}1).

General remarks.—The docks and basins are connected to the railway system of the Union, which serves all the quays, piers, and jetties except No. 1 jetty, Nos. 4 and 5 quays, Cross berth and Fish quay in Victoria basin; South quay in Alfred basin and M berth in Duncan basin.

All the quays, piers, and jetties are provided with electric cranes except Nos. 4 and 5 quays, No. 1 jetty, Cross berth and Fish quay in Victoria basin; South quay and East quay in Alfred basin; and M berth and Eastern mole in Duncan basin.

The cranes are mostly of 3 or 4 tons capacity, but there are five 15-ton cranes and there is also a floating crane with a capacity of 60 tons.

The grain elevator is situated between East quay in Alfred basin and the Cross berth in Victoria basin, and its storage bins are very conspicuous; there are conveyors from the bins to an overhead gantry on the Collier jetty.

Charts 1920, 636, 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 123.

Scend.—Caution.—Following westerly gales, which occur more frequently during winter months, considerable scend can be experienced in Table Bay Docks. Masters of vessels docking should make full use of the heavy coir springs with which all berths are equipped and ensure that their vessels are well moored. Off-shore anchors are also provided at certain berths for use as required.

Charts 123, 1920.

Cape Town.—This city is the capital of the Province of Cape of Good Hope, and the seat of the legislature of the Government of the Union of South Africa.

In 1951 the total population of Cape Town, including its suburbs, was 199,450 Europeans and 215,370 coloureds and natives.

In the year 1949-50, a total of 3,365 vessels, with an aggregate gross tonnage of 14,056,846 tons, visited the port.

Dry docks. — Floating dock. — Patent slips. — Sturrock Graving dock can accommodate the largest vessels visiting the port; it is equipped with one 50-ton crane, one 10-ton and some 2-ton cranes. For the dimensions of the graving dock, *see* Appendix II.

Robinson dry dock is entered from the north-western corner of Alfred basin. In 1950, it had a length of 500 feet (152^{m}4) and was equipped with one 4-ton and one 1½-ton crane.

The floating dock in Alfred basin has an overall length of 137½ feet (41^{m}9) and a lifting capacity of 450 tons.

There is a patent slip with a lifting capacity of 750 tons in Alfred basin, as well as four boat slips for yachts and small craft, including one in the Yacht basin.

Repairs.—All repairs to hull, engines and boilers can be executed.

Supplies.—Coal is stocked in large quantities. It can be brought off in lighters, or put on board alongside the quays at the rate of 20 tons per gang per working hour, or taken in at the coaling jetty. There are several lighters.

Large supplies of fuel oil and diesel oil are maintained. Both types of oil may be obtained by pipe-line at any berth in Cape Town docks.

General supplies of all kinds can be obtained at Cape Town.

Water, besides being obtainable alongside the berths, can be supplied by tugs.

Tugs.—Tugs are maintained by the Port Authorities. There are four powerful tugs and three pilot tugs; the four large tugs are equipped with radio, and with salvage and fire appliances and one tug is fitted with radar.

Hospitals.—There are six hospitals and two seamen's institutes.

Time signal.—A gun is fired from a battery near the flagstaff on Lion's Rump (*Lat. 33° 55′ S., Long. 18° 24′ E.*); for details, *see* Admiralty List of Lights, Fog signals, and Visual Time Signals, Volumes 4 and 10.

Life-saving.—A line-throwing apparatus is kept at the Castle, situated about 3½ cables south-westward of Duncan dock, and another is kept at the docks.

Deratisation.—*See* page 48.

Communications.—There is regular steamer communication with Europe, India and Australia, and with other ports in the continent of Africa.

Charts 1920, 636, 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Charts 123, 1920.

The city is connected to Europe by a regular air service, and there is also a regular coastal air service between Cape Town and Durban.

Cape Town is connected to the general railway system of the Union of South Africa.

Radiostation.—The radiostation is about 8 miles east-south-eastward of Cape Town; *see* page 44.

Climatic Table.—*See* page 79.

Charts 1920, 636.

GREEN POINT TO CAPE OF GOOD HOPE.—Coast.—Dangers.—From Green point (*Lat. 33° 54′ S., Long. 18° 24′ E.*), *see* page 307, the western coast of the Cape peninsula as far as the Cape of Good Hope, 27½ miles southward, is rugged and indented.

Three Anchor bay is a small indentation situated 4 cables southward of Green point. Thence the coast trends south-westward for about 1½ miles to Sea point. Saunders rocks, with depths of less than 3 fathoms ($5^{m}5$) over them, extend about 2 cables seaward from a position about 2 cables southward of Sea point. Bantry bay lies close south-eastward of Saunders rocks. A rock with less than 6 feet ($1^{m}8$) over it lies about 2½ cables north-north-eastward of Sea point.

Clifton bay is contained between two un-named points situated, respectively, 7 and 12 cables southward of Sea point. Extensive foul-ground, on which there is an islet 30 feet ($9^{m}1$) high, lies up to 2½ cables offshore from the southern of these two points.

North Lion's Paw, which dries 5 feet ($1^{m}5$), is steep-to except on its northern side, and lies about 8½ cables south-westward of Sea point, and about half a mile offshore.

South Lion's Paw, which dries 3 feet ($0^{m}9$) with a shoal head on which there is a depth of less than 6 feet ($1^{m}8$) about 2½ cables westward of it, lies about 3½ cables offshore, and 4½ cables southward of North Lion's Paw.

There are several other rocks close off the coast, both northward and southward of the Lion's Paws.

Camps bay lies close southward of the southern entrance point of Clifton bay, with Bak Oven bay about half a mile further southward. Foul ground extends up to 2½ cables offshore in most parts of this coastline.

Chart 636.

A point, known as Hottentot Huisje, situated about 4½ miles south-south-westward of Sea point, is the southern point of Kogel bay. Foul ground extends up to 3 or 4 cables offshore, in the vicinity of this point.

Kommetje or Llandudno bay lies about one mile south-south-westward of Hottentot Huisje, with Sandy bay 1½ miles further south-westward.

Logies rock lies close off the northern point of Kommetje bay, and depths of 20 fathoms ($36^{m}6$) lie from about 1½ miles to three-quarters of a mile off the intervening coast; inshore of these there are numerous off-lying rocks and patches of reef.

Oude Schip (*Lat. 34° 02′ S., Long. 18° 19′ E.*) is a low rocky point composed of large boulders, with a detached rock 25 feet ($7^{m}6$) high lying close off it, situated about three-quarters of a mile northward of Duiker point. Several rocks, with depths of less than 6 feet ($1^{m}8$) over them, extend about half a mile from the point.

Charts 2091, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 636.

Duiker point, the western extremity of Cape peninsula, situated about 9½ miles south-south-westward of Green point, is bold and rocky and has rocks and breakers extending about 4 cables seaward of it.

The coast for about 3 miles northward of Duiker point has not been closely examined, but depths of 20 fathoms (36^{m}6) may be found close inshore off Sandy bay.

Chart 2082, plan of Hout bay.

Some detached rocks, 5 to 10 feet (1^{m}5 to 3^{m}0) high, lie about 2½ cables offshore, 4 cables southward of Duiker point.

Vulcan rock, which dries 3 feet (0^{m}9) and is always marked by breakers, lies about 11 cables offshore and 16 cables southward of Duiker point. A rocky patch, which breaks in heavy weather, lies about half a mile south-eastward of Vulcan rock; a depth of 6 fathoms (11^{m}0) has been obtained over this patch, but it is possible that there are less depths over it.

Duiker island is a flat rock, 12 feet (3^{m}7) high, lying close to the coast about 1½ miles south-eastward of Duiker point; a line of breakers extends about 3 cables south-westward from the island. Though it appears to be deep between Duiker island and Vulcan rock, vessels should pass outside the latter. Duiker island is one of the Government guano islands, *see* page 19.

Chart 2082, plan of Hout bay, 636.

Hout bay.—Aspect.—Beacons.—This indentation in the high coastline is entered immediately south-eastward of Hangberg, *see* page 306, which is situated about 2 miles south-eastward of Duiker point (*Lat. 34° 02′ S., Long. 18° 18′ E.*). Constantiaberg (page 305) is situated about 2½ miles eastward of Hangberg. Little Lion's Head rises to an elevation of 1,430 feet (435^{m}9) about 2¼ miles north-eastward of Duiker point.

The coast on either side of the entrance to the bay is high and rugged, particularly on its eastern side, where hills, rising precipitously, are separated by a succession of ravines.

York point, on which are the ruins of a battery, is a low point situated 5½ cables north-eastward of Hangberg, and is composed of boulders.

A stone beacon stands close to the shore about one cable south-south-westward of York point; a reef of boulders and rocks extends south-eastward for about one cable from a position close eastward of the beacon.

A second beacon is situated close west-north-westward of York point and in a position about 1½ cables northward of the southern beacon.

Blockhouse point (*Lat. 34° 03′ S., Long. 18° 22′ E.*), on the opposite side of the bay, is situated about 7 cables eastward of York point. A conspicuous red-roofed house, situated about 6 cables northward of Blockhouse point, makes a good mark on which to enter the bay.

The head of the bay is low and sandy and Hout Bay river runs into it. There are numerous fishing huts and a cannery on the western side of the bay, but the township, which is much frequented as a seaside resort, lies in its north-eastern corner.

Fresh provisions can be obtained locally.

Breakwater. — Light. — Patent slip. — A small harbour for

Chart 2082, plan of Hout bay, 636.

fishing vessels is situated about half a cable inside York point, consisting of a breakwater 600 feet (182^{m}9) long, and a piled wharf 200 feet (61^{m}0) long. There is an average depth of 6 feet (1^{m}8) alongside the wharf. Further construction was in progress, in 1951.

A light is exhibited, at an elevation of 24 feet (7^{m}3), from a square concrete tower on the head of the breakwater.

There is a patent slip, between the root of the breakwater and the beginning of the piled wharf, capable of taking craft up to 50 tons, with an overall length of up to 60 feet (18^{m}3).

Anchorage.—Winds.—Although Hout bay is open to south-westerly winds, a small vessel can even then obtain good shelter in a depth of about 3½ fathoms (6^{m}4), with the extremity of York point in line with Slangkop point, bearing about 195°; the holding ground is excellent and of soft sand.

Except in very fine weather, the only landing place is on a small sandy beach within York point.

During South-Easters the squalls come down very heavily off the high land in willy-waws, they are variable in direction, and are strongest in force on the eastern side of the bay. After some hours, as the South-Easter freshens, the squalls reach over to York point, and in a bad South-Easter are so violent that it is better for a vessel to put to sea rather than risk the danger of parting her cable. A vessel putting to sea in such circumstances will find that southward of Chapmans bay the wind will abate in violence and become more southerly in direction. A line of foam, giving a false appearance of danger, frequently is seen across the entrance to Hout bay.

Chart 636.

Coast.—Chapmans point is situated about 2½ miles southward of Blockhouse point, and from it a reef, on which the sea always breaks, extends westward for about 3 cables. Chapmans peak, a bold steep eminence of dark appearance, rises immediately over the point to an elevation of about 1,944 feet (592^{m}5); when seen from westward it presents two summits of almost equal height.

Between Chapmans point and Slangkop point, about 3½ miles south-south-westward, is Chapmans bay, in which no safe anchorage can be obtained in any wind; the shore of the bay is a sandy beach.

Local Magnetic Anomaly.—A local Magnetic Anomaly has been reported in the vicinity of Slangkop point.

Slangkop point.—Light.—Life-saving.—This point, on which is the village of Kommetje, is low and sandy, but immediately within it the land rises steeply to the summit of a flat-topped hill, 560 feet (170^{m}7) high. Rocks and patches of kelp fringe the point, and foul ground extends nearly 1½ miles northward from it.

Slangkop point (*Lat. 34° 09′ S., Long. 18° 19′ E.*) may be identified by the lighthouse, and also by a long strip of sand, low down on the hill side, which extends southward for about one mile from the point. With the exception of the sand patch under Little Lion's Head, *see* page 306, and a patch of sand on Rooi kop, situated on the False bay side of the Cape peninsula, there are no other patches of sand visible above the coast line between Lion's Head and the Cape of Good Hope. From northward, when the strip of sand is shut in, Slangkop point appears as a long flat plateau, *see* views facing page 311.

Charts 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 636.

A light is exhibited, at an elevation of 135 feet ($41^{\mathrm{m}}5$), from a white circular iron tower, 108 feet ($32^{\mathrm{m}}9$) in height, situated on Slangkop point, *see* view facing this page.

A line-throwing apparatus is kept at Slangkop point.

Coast.—From Slangkop point to the mouth of Klaasjagers river, about 6 miles south-south-eastward, the coast becomes higher and rugged.

Menskop point is situated about 1½ miles southward of the mouth of Klaasjagers river, with Olifants (Olifants Bosch) point about 1¼ miles further southward. Hoek van Bobbenjaan (Blaauwberg point) lies about 2½ miles south-south-eastward of Olifants point, with the Cape of Good Hope about 4¾ miles further south-eastward. Between Olifants point and the Cape of Good Hope the coast is from 300 to 400 feet ($91^{\mathrm{m}}4$ to $121^{\mathrm{m}}9$) high, and is tolerably regular in outline; *see* view on chart 636.

Dangers.—Sunken rocks with patches of kelp fringe the coast from Slangkop point to Olifants point, and extend 5 cables offshore in places. With a westerly swell, the sea breaks heavily to a distance of nearly one mile offshore.

Albatros rock, with a depth of less than 6 feet ($1^{\mathrm{m}}8$) over it, and from 7 to 13 fathoms ($12^{\mathrm{m}}8$ to $23^{\mathrm{m}}8$) close round it, lies half a mile south-westward of Olifants point.

A rocky bank, with depths of 10 fathoms ($18^{\mathrm{m}}3$) over it, and on which the sea breaks in bad weather, lies about 1½ miles west-south-westward of Hoek van Bobbenjaan; in heavy southerly gales, a continuous line of breakers has been observed to extend from this bank to the coast.

A bank, on which the depths are less than 20 fathoms ($36^{\mathrm{m}}6$) and are very irregular, extends about 3 miles north-westward from Hoek van Bobbenjaan; vessels should be most careful to keep in depths of more than 20 fathoms ($36^{\mathrm{m}}6$).

A reef lies about 2 cables offshore in a position about 2½ miles south-eastward of Hoek van Bobbenjaan.

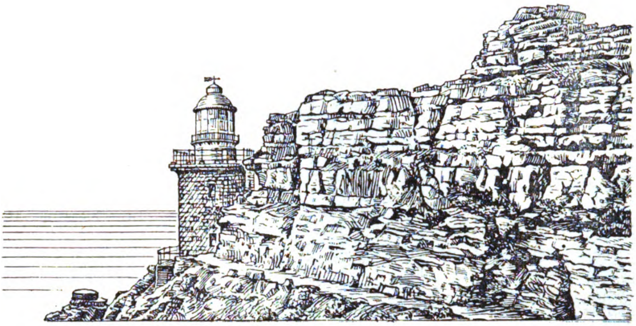
CAPE OF GOOD HOPE.—The southern extremity of the Cape peninsula is surmounted by two peaks and terminates in a like number of points, of which latter Cape Maclear is the western and Cape point (*Lat. 34° 21′ S., Long. 18° 30′ E.*) the eastern. The northern of the two peaks, Vasco da Gama peak, 880 feet ($268^{\mathrm{m}}2$) high, is situated about 1¼ miles north-westward of the extremity of Cape point; the south-eastern of the two peaks is 800 feet ($243^{\mathrm{m}}8$) high, and is situated near the pitch of Cape point. *See* view on chart 636 and views facing page 317.

There is a small sandy bay, called Buffel's bay, between Cape point and Cape Maclear in which vessels in a sinking condition may be beached in greater safety than on any other part of the adjacent coast westward of Cape point.

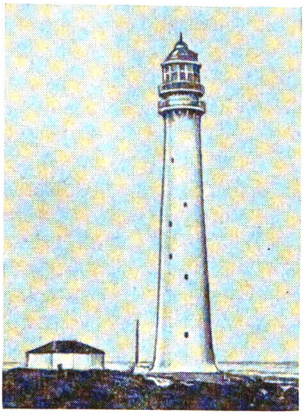
Lights. — Radiobeacon. — Signal station. — Life-saving. — A light is exhibited, at an elevation of 286 feet ($87^{\mathrm{m}}2$), from a square masonry tower, 30 feet ($9^{\mathrm{m}}1$) in height, situated on the extremity of Cape point, *see* view facing this page.

An auxiliary light is exhibited from the base of the lighthouse, at an elevation of 251 feet ($76^{\mathrm{m}}5$).

Charts 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

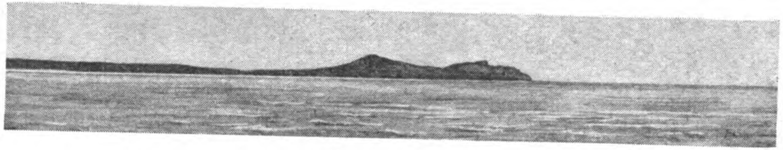


Lighthouse bearing 168°.
Cape point lighthouse from northward.
(*Original dated* 1918.)

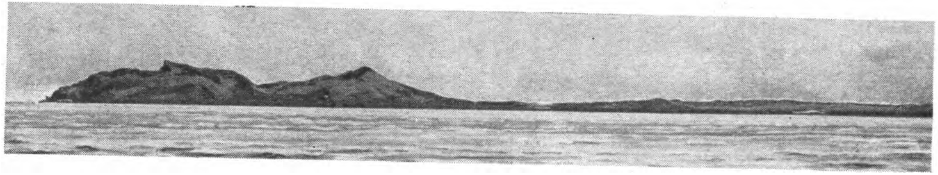


Slangkop point lighthouse.
(*Original dated* 1918.)

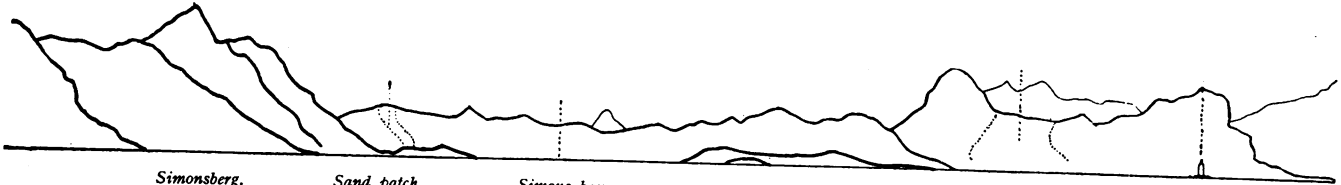
To face page 317.



Cape of Good Hope from south-westward.
(*Original dated* 1918.)



Cape of Good Hope from eastward.
(*Original dated* 1918.)


Simonsberg.
Sand patch.
Simons bay.
Sand patch.
Roman rocks lighthouse, ϕ Elsie's peak, bearing 328°, distant 6 miles.

Simons bay.
(*Original dated prior to* 1931.)

Chart 636.

A radiobeacon is situated about half a cable south-westward of the light tower on Cape point.

A signal station, situated on Cape point close to the lighthouse, is connected to the general telegraphic system and reports can be transmitted through Lloyd's, *see* page 38. Communication by flag signalling is discontinued on Sundays.

A line-throwing apparatus is kept at Cape point.

Offshore depths.—A bank, on which the depths are less than 20 fathoms (36^{m}6), fringes the Cape of Good Hope and extends about 2¼ and 1¾ miles south-westward and southward, respectively, from Cape Maclear, and 2, 1½, and one miles southward, south-eastward, and north-eastward, respectively, from Cape point.

Rocky bank, with a least depth over it of 13 fathoms (23^{m}8), rock and coral, lies from about 4½ to 6½ miles south-eastward of Cape point. This bank is covered by the *red* sector of Cape Point light between the bearings of 299° and 023°.

Off-lying dangers. — Bellows rock, lying on the edge of the 20-fathom (36^{m}6) bank about 2 miles southward of Cape point, dries about 5 feet (1^{m}5) and always breaks. It is steep-to except on its south-western side where there are sunken rocks, on which the sea does not always break, at a distance of about one cable from it.

Anvil rock, with a depth of 6 feet (1^{m}8) over it, lies at the eastern end of a 3-fathom (5^{m}5) rocky patch, about 1¼ miles south-eastward of Cape point. It breaks only at low water with a heavy swell, and there are depths of from 14 to 18 fathoms (25^{m}6 to 32^{m}9) close outside it.

South-west reefs, with depths of 4 and 5 fathoms (7^{m}3 and 9^{m}1) over them, usually break and appear to be patches on a rocky ledge projecting south-westward from Cape Maclear. They lie about 2 miles west-south-westward of Cape point, and on no account should vessels attempt to pass inside them.

Diaz rock (*Lat. 34° 21′ S., Long. 18° 30′ E.*), about 8 feet (2^{m}4) high, is connected to Cape point by a sunken reef. Though it is deep about 2 cables seaward of the rock, it shoals again outside that distance.

Three pinnacle rocks, with depths of 4½ and 5½ fathoms (8^{m}2 and 9^{m}1) over them, lie between Diaz and Anvil rocks, rendering the passage between the latter rocks unavailable for vessels of deep draught, or even for smaller vessels in bad weather.

Bellows, Anvil and Diaz rocks, and also the pinnacle rocks between the latter two, are covered by the *red* sector of Cape Point light between bearings of 299° and 023°.

Slangkop point bearing 340° and open westward of Olifants point, leads westward of all the above dangers, but does not clear those off Hoek van Bobbenjaan.

Constantiaberg, bearing 339°, and well open eastward of Zwart kop, leads eastward of all the above dangers, and between Anvil rock and Rocky bank.

Vasco da Gama peak bearing 299° and open northward of the lighthouse, leads north-eastward of Anvil rock.

Directions.—In clear weather, vessels approaching the Cape of Good Hope from westward at night should make Cape Point light at a distance of about 23 miles, except when it bears more than 106°,

Charts 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

in which case it will be hidden by the land and Slangkop point light should be sighted at a distance of about 17 miles. Should the land or lights not be seen, a vessel should not approach the coast, but should keep south-westward in depths of more than 50 fathoms ($91^{m}4$) until such time as her position has been accurately ascertained.

Vessels rounding the Cape from westward, if bound into False bay, should pass not less than half a mile southward of Bellows rock, and thence steer eastward between Rocky bank and Anvil rock until clear of the latter.

Caution.—Vessels approaching The Cape, especially in thick weather or in any doubt of their positions, should never omit the precaution of obtaining soundings in good time.

FALSE BAY.—This large bay is entered between the Cape of Good Hope and Cape Hangklip (*Lat. 34° 23′ S., Long. 18° 50′ E.*), situated about 17 miles east-south-eastward. There are several dangers in the bay, but its northern and eastern sides are clear, though the bottom is foul and in most places unfit for anchorage. Breakers line the shore in a depth of from 4 to 5 fathoms ($7^{m}3$ to $9^{m}7$) about half a mile from the beach.

Western side of False bay.—Explosives dumping ground.—Beacons.—This side of False bay is also the eastern side of the Cape peninsula. Buffels bay is a small indentation in the coastline, at which there is a fishing establishment and in which landing is possible, situated about 3 miles north-north-westward of Cape point and is marked by a white sand patch. On the ridge of the hills behind this bay is a beacon and another stands close northward of the bay ; these beacons in line, bearing 233°, mark the position of Whittle rock, *see* page 321. There are depths of 4 or 5 fathoms ($7^{m}3$ or $9^{m}1$) close to the shore of the bay, and a 15-foot ($4^{m}6$) patch lies about 3 cables offshore, three-quarters of a mile north-north-westward of Cape point.

Smitswinkel bay is situated about 3 miles northward of Buffels bay and the intervening coast is backed by four sharp peaks including Paulsberg (page 305). Rocks, some of which are above water, project about 4 cables from Partridge (Millers) point, the northern entrance point of Smitswinkel bay, and also from its southern entrance point. Batsata rock, 8 feet ($2^{m}4$) high, is the highest of those off the southern point ; a patch, over which there is a depth of 2 fathoms ($3^{m}7$), lies 2 cables north-eastward of Batsata rock.

About 9 cables south-eastward of Partridge point is a circular area, indicated by a pecked line on the chart, in which explosives have been dumped ; the area is now disused, but vessels should avoid it and anchoring or trawling within it are prohibited.

Millers (Rockland) point, situated about 1¼ miles northward of Partridge point, is the most prominent point on the western side of False bay ; it slopes down to a ledge of dry rocks off which, at a distance of about 2 cables south-eastward, is Bakkoven rock, an isolated rock, 9 feet ($2^{m}7$) high, with a depth of 11 fathoms ($20^{m}1$) close to it ; Castle rock, which dries, lies about 3 cables southward of Bakkoven rock.

Oatland point, with a few rocks off it, on one of which is a beacon for marking the position of Whittle rock, *see* page 321, is situated about 1½ miles northward of Millers point. Between these points

Chart 636.

The Spaniard and other rocks lie within 3 to 5 cables of the shore. Rocklands point (*Lat. 34° 13′ S., Long. 18° 28′ E.*) is situated about one mile north-north-westward of Millers point.

Simons bay is situated between Oatland point and the southern point of the entrance to Elsie's bay, about 3 miles north-north-westward; *see* page 322.

Chart 1849.

A flagstaff, 64 feet ($19^{m}5$) in height, stands about a cable east-north-eastward of the rear beacon of the northern pair which mark Whittle rock (page 321); two radio towers and three radio masts stand about a mile westward of the same beacon.

Chart 636.

Eastern side of False bay.—Lights.—Patent slips.—Cape Hangklip, the eastern entrance point of False bay, is only 10 feet ($3^{m}0$) high, but at about 1½ miles northward of it, Hangklip berg rises to an elevation of 1,448 feet ($441^{m}3$); this mountain, sometimes called False cape, is quoin-shaped, and when seen from southward resembles an island; from some directions its western face seems to overhang, hence its name; a sandy patch extends half-way up its south-eastern side, *see* views on chart 636.

A rock, over which the depth is less than 6 feet ($1^{m}8$), lies about three-quarters of a mile west-north-westward of the cape, and about 3½ cables offshore. As a heavy sea always breaks on the cape, and also for some distance outside this rock, vessels should give it a berth of at least one mile.

Within Hangklip berg, the land is low, but rises again to Sharp peak, a conspicuous mountain 2,826 feet ($861^{m}4$) high, at a distance of about 3½ miles north-eastward (chart 2082).

The eastern shore of False bay, from Cape Hangklip (*Lat. 34° 24′ S., Long. 18° 50′ E.*) northward as far as Gordons bay, a distance of about 14 miles, is bold and has no outlying dangers at a greater distance than three-quarters of a mile from it.

The Hottentot Holland range of mountains (chart 2082) slopes down to the southern side of Gordons bay, whence to Sharp peak is an unbroken chain of mountains.

Pringle bay, situated about 3 miles northward of Cape Hangklip, is open to westerly winds, but affords the best shelter to be found on the eastern side of False bay during south-easterly gales, in depths of from 9 to 10 fathoms ($16^{m}5$ to $18^{m}3$).

Kogel bay, between Pringle and Gordons bays, is not a good anchorage as the bottom in many places is rocky, though it does afford shelter from southerly and easterly winds.

Gordons bay is not recommended as an anchorage, as it affords but little shelter from south-easterly gales, notwithstanding the high hills on its southern and eastern sides. A heavy swell enters the bay with a south-easterly wind, causing a vessel at anchor there to lie across the wind. The bottom is sand and rock.

There is a small harbour for fishing vessels in Gordons bay, consisting of a northern breakwater about 600 feet ($182^{m}9$) long, and a southern breakwater about 1,100 feet ($335^{m}3$) long. A concrete jetty, 80 feet ($24^{m}4$) long and 80 feet ($24^{m}4$) wide, has an average depth of 8 feet ($2^{m}4$) alongside.

The average depth in the harbour is 7 feet ($2^{m}1$).

Charts 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 636.

A light is exhibited, at an elevation of 26 feet ($7^{m}9$) from a square concrete tower on the head of each breakwater.

There are two patent slips capable of taking craft up to 30 and 60 tons respectively.

The South African Nautical College, *General Botha*, is established at Gordons bay.

The village had a population of 1,025 Europeans, and 310 coloureds and natives, in 1950/51.

Mostert's bay, on the northern side of the entrance to Gordons bay, is a natural boat harbour formed by the arc of a circle of sunken rocks extending some distance from the shore and having a narrow entrance. It affords good shelter inside, and on its northern side is the town of Strand, where there is a jetty.

Strand, which is connected by rail and road with Cape Town, for which it is a seaside resort, had a population, in 1948, of 9,270 of whom 5,270 were Europeans. The town of Somerset West, with a population of about 6,000, is situated about 2½ miles north-eastward of Strand.

A rocky patch, over which there is a depth of 5 fathoms ($9^{m}1$), lies about 1¼ miles southward of the entrance to Mostert's bay.

Northern side of False bay.—The northern side, or head, of False bay is a low sandy beach, with a continuous line of surf fronting it, so that it affords no landing and should in all circumstances be avoided.

North-western side of False bay.—Buoy.—Elsie's peak, 990 feet ($301^{m}7$) high, surmounts a rounded point separating Elsie's bay from Fishhoek bay, and is marked by a conspicuous quarry on its southern side.

A radar target buoy, painted in red and yellow bands and fitted with a bell, is moored about one mile offshore abreast Elsie's peak.

Fishhoek bay is a slight indentation in the coast at the eastern end of the valley running through the Cape peninsula to Chapmans bay, *see* page 315.

Northward of Simons bay, the land, except at Fishhoek bay, ranges in height from about 800 to 1,200 feet ($243^{m}8$ to $365^{m}8$), rising to 1,664 feet ($507^{m}2$) at the summit of Muizenberg, *see* view on chart 636.

There are four remarkable sand patches on this part of the coast, the only ones on the western side of False bay, except that within Buffels bay; the first is situated on the north-western shore of Simons bay, the second between that and Elsie's peak, the third in Elsie's bay, and the fourth in Fishhoek bay; the western patch is a streak running down from the top of the hill, *see* view on chart 636 and view facing page 317.

Kalk bay is a watering place situated northward of Fishhoek bay immediately under the southern summit of the high land which terminates north-eastward in Muizenberg. It has a small harbour for fishing vessels, consisting of a breakwater 782 feet ($238^{m}3$) long, connected to the railway, an inner mole, and a quay 260 feet ($79^{m}2$) in length, at the head of the harbour.

Muizenberg (*Lat. 34° 07′ S., Long. 18° 28′ E.*) is a seaside resort at the foot of the mountain of that name. It had a population, in 1951, of about 10,000. From Simons bay, the railway skirts the shore to Muizenberg, at which place it turns inland towards Cape Town.

Lights.—A light is exhibited, at an elevation of 25 feet ($7^{m}6$), from

Charts 2082, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 636.

a tower, 15 feet (4^{m}6) in height, at the head of Kalk Bay breakwater, and another, at an elevation of 17 feet (5^{m}2), from the head of the inner mole.

Dangers in False bay.—Beacons.—Light-and-bell-buoy.— Whittle rock, with a depth over it of 7 feet (2^{m}1), seldom breaks. It lies about 4 miles east-south-eastward of Bakkoven rock (page 318), on the southern side of a rocky patch over which the depths vary from 7 to 10 fathoms (12^{m}8 to 18^{m}3).

A light-and-bell-buoy, exhibiting a *red flashing* light *every five seconds* and carrying a radar reflector, is situated close eastward of the rock.

The position of Whittle rock is indicated by two pairs of beacons which in line lead directly over it.

The front beacon of the southern pair, situated close northward of Buffels bay, consists of a white concrete obelisk surmounted by a barrel 48 feet (14^{m}6) in height; the rear beacon, situated on the ridge of the hills south-westward of Buffels bay, consists of a black concrete beacon surmounted by a barrel, 48 feet (14^{m}6) in height. These beacons in line bear 233°.

The front beacon of the northern pair, erected on a flat-topped rock near Oatland point, is 35 feet (10^{m}7) in height, painted white with a red horizontal band in its centre, and has an elevation of 56 feet (17^{m}1); the rear beacon, standing on the shoulder of a hill about 9¼ cables west-north-westward, is diamond-shaped, painted white, and 30 feet (9^{m}1) in height. These beacons, which are reported to be difficult to distinguish from the vicinity of the rock, together with a white-washed patch on a hill north-westward of Simonstown, in line bear 296°.

Chapmans peak, *see* page 315, bearing 315° and well open westward of Elsie's peak, leads about 4 cables westward of Whittle rock; and Roman Rocks lighthouse, *see* page 322, in line with Elsie's peak, bearing 328°, *see* view facing page 317, leads midway between Whittle rock and Partridge point. Also, if either pair of the beacons mentioned above are kept open of one another, respectively, Whittle rock will be cleared.

Seal island (*Lat. 34° 08′ S., Long. 18° 35′ E.*) is a low rocky islet, situated about 6¾ miles north-north-eastward of Whittle rock, and is surrounded by sunken rocks on which the sea usually breaks. It is one of the Government guano islands, *see* page 19, but landing on it is difficult, except when the sea is very smooth.

A conspicuous beacon, 223 feet (68^{m}0) in height, stands in the centre of Seal island.

A white wooden beacon, surmounted by a cross and elevated about 40 feet (12^{m}2), stands on the north-western side of Seal island.

York shoal is a rocky patch, with depths of from 6 feet to 4½ fathoms (1^{m}8 to 8^{m}2) over it, lying about 1¼ miles south-south-eastward of Seal island; the sea generally breaks on its northern part, over which there is a depth of less than 2 fathoms (3^{m}7).

East shoal, lying about 3¼ miles east-south-eastward of Seal island, has general depths over it of from 4 to 9 fathoms (7^{m}3 to 16^{m}5), but in one place there is a rock which nearly dries, and on which the sea always breaks.

A bank, on which the least depth is 6¼ fathoms (11^{m}4), and on which

Charts 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 636.

the sea breaks only in heavy gales, lies off Gordons bay, about 5¾ miles eastward of East shoal.

Chart 1849.

SIMONS BAY.—This bay is situated about 11 miles northward of Cape point, and near the north-western corner of False bay; it is accessible all the year round, and affords perfect shelter, for with heavy south-easterly gales, the only winds that cause inconvenience, vessels ride safely, and although the bay is exposed to easterly and north-easterly winds, these never blow with any strength.

Inside depths of 5 fathoms ($9^{m}1$) there are several detached dangers, some drying a few feet.

Simonstown is a naval dockyard port.

Dockyard port Limits.—Regulations.—Regulations for this area, the limits of which are shown by pecked lines on chart 1849, will be found in Appendix I.

Dangers in approach.—Beacon.—Roman rocks (*Lat. 34° 11′ S., Long. 18° 28′ E.*) occupy a position in the centre of the approach to Simons bay, about one mile offshore; they consist of a group of rocks on the southern side of a bank on which the general depths are less than 10 fathoms ($18^{m}3$); one rock, on which is a lighthouse, is above water and is on the north-western side of the group; the remainder are awash and the group is surrounded by foul ground.

Castor rock, on the northern side of the same bank as Roman rocks, has a least depth over it of 16 feet ($4^{m}9$), and between it and the latter are patches of 18 and 22 feet ($5^{m}5$ and $6^{m}7$). A 32-foot ($9^{m}8$) rocky patch lies about 1¾ cables east-north-eastward of Roman Rocks light-structure.

Rambler rock is a 27-foot ($8^{m}2$) patch, lying about 3 cables south-eastward of Roman Rocks lighthouse; a small rocky patch with a depth of 34 feet ($10^{m}4$) over it and which is steep-to lies nearly one cable northward of Rambler rock.

Noah's Ark is a flat-topped rock, 20 feet ($6^{m}1$) high, resembling a barn, lying about one-quarter of a mile offshore south-westward of Roman rocks; reefs extend a short distance north-westward and south-eastward from it.

Maidstone rock, about 2 cables east-south-eastward of Noah's Ark, is a sharp pinnacle with a depth of 23 feet ($7^{m}0$) over it. A 47-foot ($14^{m}3$) shoal is charted about 6 cables east-south-eastward of Noah's Ark; rocky patches with least depths of 50 and 54 feet ($15^{m}2$ and $16^{m}5$) over them lie about 3 cables and 4½ cables, respectively, eastward of Noah's Ark (*Lat. 34° 12′ S., Long. 18° 27′ E.*).

Rocky patch, on which the least depth is 10 feet ($3^{m}0$), lies about 1½ cables offshore and 3½ cables south-south-eastward of Noah's Ark.

Nimrod rock, with a depth of less than 6 feet ($1^{m}8$) over it, lies about 2¼ cables west-north-westward of Noah's Ark.

Phœnix shoal, lying about 3 cables north-westward of Noah's Ark, has a depth of 3 feet ($0^{m}9$) near its edge, between which and the shore the depths are shallow and the bottom foul, with several patches drying from 2 to 5 feet ($0^{m}6$ to $1^{m}5$); in fact there are shoals in several places inshore of a line joining the north-eastern extremity of Phœnix shoal and Rocky patch, the positions of which can best be seen on the chart. One of these shoals, which dries 4 feet ($1^{m}2$) and is known

Charts 636, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 1849.

as Phœnix blinder, situated about 1¼ cables west-north-westward of Nimrod rock, is marked by a beacon, consisting of a diamond painted in black and white horizontal bands.

Light.—Buoys.—A light is exhibited, at an elevation of 54 feet ($16^{m}5$), from a white cylindrical iron tower, with a red lantern and cupola, 45 feet ($13^{m}7$) in height, on the drying rock of Roman rocks (*Lat. 34° 11′ S., Long. 18° 28′ E.*).

A red can-shaped buoy, surmounted by a staff and cage, is moored about half a cable northward of Castor rock.

A red can-shaped buoy is moored off the north-eastern side of Phœnix shoal.

Dockyard.—The dockyard basin, situated on the south-eastern side of Simons bay, is formed by the East breakwater and West pier, which enclose an area about 1½ cables square. The entrance is about 290 feet ($88^{m}4$) wide, and the basin has depths in it of from 29 to 48 feet ($8^{m}8$ to $14^{m}6$), with the exception of the portion of the south-eastern corner cut off by the line of the dock wall, where the depth varies from 11 to 19 feet ($3^{m}4$ to $5^{m}8$). The dry dock, *see* Appendix II, and workshops are situated at the southern end of the basin.

The *Thames*, a hulk, is moored in the south-eastern corner of the basin, and about half a cable south-west of her is a pier which, in 1944, had been dredged to a depth of 18 feet ($5^{m}5$) along both sides for a distance of 230 feet ($70^{m}1$) from its head; a dolphin stands a short distance north-eastward and south-westward of the head of the pier.

Westward of the basin are the coal stores, a camber dredged to 4 feet ($1^{m}2$), slips, etc.; the Admiral's house, with its jetty, is on the western side of the bay.

Lights.—Beacons.—A light is exhibited, at an elevation of 56 feet ($17^{m}1$), from a masonry tower, 42 feet ($12^{m}8$) in height, situated on the northern angle of East breakwater (*Lat. 34° 11′ S., Long. 18° 26′ E.*).

Lights are exhibited, at an elevation of 27 feet ($8^{m}2$), from iron structures, 22 feet ($6^{m}7$) in height, situated, one on each side of the entrance to the basin, near the heads of the East breakwater and the West pier, respectively.

A flagstaff stands about a quarter of a cable west-south-west of West Pier light-structure.

A beacon, 96 feet ($29^{m}3$) in height, stands about 1¼ cables south-south-westward of the entrance to the dry dock.

Lights are also exhibited at the head of the Town pier and the end of the camber pier.

Two rocks, which dry 2 and 3 feet ($0^{m}6$ and $0^{m}9$) and are known as the Oyster blinders, situated about one cable east-north-eastward and half a cable north-eastward, respectively, of the head of Town pier, are each marked by a beacon, consisting of a diamond painted in black and white horizontal bands.

Two lights are exhibited occasionally from the signal station flagstaff southward of the Admiral's jetty.

Wharf rock.—Buoy.—Wharf rock, with a depth of 9 feet ($2^{m}7$) over it, lies about 1¼ cables north-eastward of the dockyard camber, and is marked by a red barrel buoy surmounted by a notice board inscribed "Rock."

Signal station.—The signal station is situated about three-quarters of a cable southward of the root of the Admiral's jetty.

Charts 636, 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Chart 1849.

Anchorage.—Merchant vessels may anchor only in the berths assigned to them by the Senior Naval Officer, but a good berth for a large vessel is in about 10 fathoms ($18^{m}3$), half a mile offshore, with Noah's Ark (*Lat. 34° 12′ S., Long. 18° 27′ E.*) bearing about 117°, and the dockyard clock 215°. In 1935, foul ground, due to a sunken cable, was reported about 2¼ cables northward of the light-structure on the head of West pier; and vessels were warned not to anchor on it.

Vessels should moor with the anchors north-westward and south-eastward, with the best bower in the former direction during winter, when north-westerly winds are frequent and blow in strong gusts over the hills, and *vice versa* during the opposite season, when south-easterly winds predominate.

Moorings.—Scend.—Moorings for various classes of vessels are laid down off the dockyard and westward of West pier.

Nos. 2, 3, 4, and the Flagship's moorings are in depths of over 6 fathoms ($11^{m}0$). In the basin, off-moorings are laid abreast all berths. By the use of these off-moorings ships are kept well away from the basin wall and are thus protected from damage during the periods of scend which occur from time to time in the basin.

This scend is seldom worse than a minor source of anxiety to ships alongside and is not constantly predictable. Moderate winds from between North and East will arouse it very quickly; prolonged South-Easters will in due course have the same effect; and a considerable scend will sometimes be felt for a day or two after the cessation of hard blows from the North-west.

Charts 1849, 636.

Directions.—Steam vessels, after clearing Anvil rock as previously directed, *see* page 318, should steer about 356°, midway between Whittle rock and the western shore, and when Elsie's peak and Roman Rocks lighthouse are in line, bearing 328°, *see* view on chart 636 and view facing page 317, course should be altered to keep that mark on until within one mile of the lighthouse, when the vessel should be steered to pass midway between the lighthouse and Noah's Ark.

The red buoy marking Phœnix shoal can be rounded at a convenient distance and the anchorage steered for, but should that buoy be missing, bearings of the East Breakwater light will enable the shoal to be avoided.

In thick weather, and being uncertain of the position, a vessel should anchor when in a depth of less than 20 fathoms ($36^{m}6$).

By night.—When eastward of Anvil rock, with Cape Point light bearing about 298°, distant 3 miles, from near which position Roman Rocks light may be seen, a vessel should steer about 356° until the latter bears 328°, when it may be steered for, passing through the sector of the East Breakwater light which shows *white* between the bearings of 306° and 315° and leads between Bakkoven and Whittle rocks, and also through the sector of the same light which shows *red* between the bearings of 306° and 276° and covers the Maidstone rock and Phœnix shoal, etc.; when the sector of East Breakwater light, which shows *white* between the bearings of 276° and 265° and leads between Roman rocks (*Lat. 34° 12′ S., Long. 18° 28′ E.*), and Phœnix shoal, is entered, that light may be steered for and the East breakwater rounded as convenient.

Charts 2082, 578, 2095, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

Charts 1849, 636.

Passing eastward of Whittle rock, Cape Point light should not be brought to bear less than 220° until Roman Rocks light bears about 300°, when the vessel can be steered northward into the sector of the East Breakwater light which shows *white* between the bearings of 265° and 276° and leads southward of York shoal.

Compass adjustment.—Vessels wishing to check or adjust compasses will find Hangklip berg and Sharp peak, *see* page 319, useful for that purpose. It very often happens that Hangklip berg shows up well when Sharp peak is obscured by mist; the true bearings of Hangklip berg, from a position 2¼ cables, 014°, from the head of the Town pier in Simons bay, is 118½°, and of Sharp peak is 109°. As these mountains are both over 20 miles distant from the bay, these bearings are not materially affected by the position of the vessel in the bay.

Simonstown.—Port facilities.—This town lies at the foot of the hills at the head of Simons bay, of which hills Simonsberg, which rises to an elevation of 1,870 feet (570^{m}0), is situated about one mile southward of the dockyard.

In 1950/51, the total population was 10,400 of whom 6,100 were Europeans.

There is a naval hospital, a naval sanatorium, and a cottage hospital, which latter has accommodation for 25 patients.

There is a sailors' home and an institute.

Supplies of fresh meat, fish, vegetables, and bread are plentiful; an ample supply of fresh water is available to vessels alongside, or by tank vessel. Supplies of any kind not obtainable in Simonstown can be procured from Cape Town.

Repairs to engines and boilers can be undertaken in the dockyard.

There is a 50-ton crane on West pier and a 20-ton crane on East breakwater.

Shipping.—In 1949-50, a total of 13 vessels with an aggregate gross tonnage of 65,377 tons, entered the port.

Life-saving.—A line-throwing apparatus is kept in the town.

Climatic table.—*See* page 80.

Caution.—A poisonous fish about 6 inches (152 mm.) in length, its back dark with deep black stripes, and belly white with faint yellow patches, is known as the toad fish; it swims near the surface, is easily taken with a hook and line, and when taken from the water puffs out considerably. Should any portion of this fish be eaten, death ensues in a few minutes.

Coast.—For the description of the coast eastward of Cape Hangklip (*Lat. 34° 24′ S., Long. 18° 50′ E.*), *see* Africa Pilot, Volume III.

Charts 2082, 2095, 578, 1013, 596, 2202a, 748a, 2203, 2127, 2483.

CHAPTER IX

ASCENSION ISLAND—ST. HELENA ISLAND—THE TRISTAN DA CUNHA GROUP—GOUGH ISLAND—BOUVETØYA

CLIMATE AND WEATHER.—*See* page 57.

Chart 1691.

ASCENSION ISLAND.—General remarks.—This island is of volcanic origin, and situated in the South Atlantic ocean about 990 miles southward of Sierra Leone and 703 miles north-westward of St. Helena, lies between the parallels of 7° 53′ S. and 8° 00′ S., and the meridians of 14° 18′ W. and 14° 26′ W.

It is the focus of several trans-oceanic submarine telegraph cables, and its population is entirely composed of members of the staff of the Cable and Wireless, Limited and their families, together with some servants and labourers, who are natives of St. Helena. The total population, in 1949, was 159. *See* page 22.

Aspect.—The surface of Ascension island is extremely irregular, and when viewed from seaward presents a rugged and uninviting appearance. The greatest elevation, 2,817 feet ($856^{m}6$), is attained at The Peak, the summit of Green mountain, which latter is so called from the colour of its apex. There are about 40 cones of various magnitudes on the island, being extinct craters from many of which the courses of the lava streams may be traced on their way to the sea. Green mountain is surrounded by numerous other craggy peaks of less elevation, having between them deep gorges and dark ravines. *See* view facing page 336.

Practically the only signs of vegetation on the island are on Green mountain where vegetables are successfully cultivated; the summit of this mountain where rains fall more frequently than on the less elevated parts of the island, is covered with rock roses and ferns, and is a graceful oasis amidst waste and desolation. The mountain is generally more or less obscured by mist for some part of the 24 hours. All water is obtained from the cement rain catchments on the mountain, and is conveyed through pipes to covered tanks in Georgetown, situated on the north-western side of the island.

The Devil's Riding School (*Lat. 7° 58′ S., Long. 14° 23′ W.*) is a crater, more rugged and remarkable than the rest, situated about 2 miles west-south-westward of Green mountain.

Chart 1691, plan of Clarence bay.

Clarence bay.—This bay, off which is the usual anchorage for

Charts 2202a, 2203, 2127, 2483.

vessels visiting the island, is situated on the north-western or leeward side of Ascension island almost mid-way between Catherine and Pyramid points. *See* view on chart 1691.

From Catherine point, the coast trends north-eastward for about 7 cables to a point, about 75 feet ($22^{m}9$) high, which is situated at the south-western end of Clarence bay and on the south-western side of which is Fort Thornton. At a short distance behind this part of the coast is the settlement of Georgetown.

Tartar rock, 5 feet ($1^{m}5$) high is situated about three-quarters of a cable north-westward of Fort Thornton, and two rocks, 6 feet ($1^{m}8$) high, lie about a quarter of a cable offshore northward of Fort Thornton.

A shelf, with depths of less than 3 fathoms ($5^{m}5$) over it, extends up to one cable offshore in Clarence bay.

Fort Hayes stands on Hayes hill, 106 feet ($32^{m}3$) high, situated about 4 cables north-eastward of Catherine point (*Lat. 7° 56′ S., Long. 14° 25′ W.*).

Bates point, at the north-eastern end of Clarence bay, is situated about 6 cables north-eastward of Fort Thornton; it is formed of lava rock, and Bates rock, 22 feet ($6^{m}7$) high, lies close off it; a shoal, over which the depth is 3 fathoms ($5^{m}5$), lies about half a cable north-westward of Bates rock.

Pyramid point, situated about 6 cables north-north-eastward of Bates point, is about 30 feet ($9^{m}1$) high, and on it is a pyramidal rock, the summit of which is at an elevation of 63 feet ($19^{m}2$). This rock is a useful mark for approaching the anchorage, but it is difficult to distinguish it, until bearing about 023° as it does not appear on the skyline until then; it is a brown peaked rock standing near the water's edge, and the coast in its vicinity is of a different colour.

Comfortless cove is small and is situated at the head of the bay between Bates and Pyramid points; its shore is composed of a mass of irregularly shaped clinkers. Merchant vessels are on no account to use this landing place without the direct permission of the Resident Magistrate.

Cross hill is one of the many rounded hills on the island whose soil is composed of ashes and a ferruginous earth which is so dry and porous that no sooner does the rain fall than it is absorbed and disappears; it is 868 feet ($264^{m}6$) high and conspicuous, and overlooks the settlement of Georgetown; on its summit is a flagstaff.

Danger.—An extensive area of shoal and foul ground, over which the depths vary from 6 feet to 4½ fathoms ($1^{m}8$ to $8^{m}2$) in places, the bottom being rocky and uneven, extends about 6 cables in a north-westerly direction from the coast between Catherine point and Fort Thornton.

Lights.—Beacons.—Buoyage.—A light is exhibited, when ships are in the vicinity, at an elevation of 70 feet ($21^{m}3$), from a white column, 16 feet ($4^{m}9$) in height, with a red diagonal stripe, situated about 2¾ cables east-north-eastward of Catherine point.

A light is exhibited, when ships are in the vicinity, at an elevation of 90 feet ($27^{m}3$), from a white column, 15 feet ($4^{m}6$) in height, with two black horizontal bands, situated about 2½ cables south-eastward of Fort Thornton.

A light is exhibited, when ships are in the vicinity, at an elevation

Chart 1691, plan of Clarence bay.

of 115 feet ($35^{m}0$), from a white column, 15 feet ($4^{m}6$) in height, with two black horizontal bands, situated about one-third of a cable south-eastward of the last-mentioned light.

The above lights, which are in line when bearing 139°, are for the use of vessels anchoring at night.

Redpole monument (*Lat. 7° 56′ S., Long. 14° 25′ W.*) is a prominent white square pyramidal obelisk, 15 feet ($4^{m}6$) in height, the apex of which is at an elevation of 90 feet ($27^{m}4$), situated about mid-way between, but a little south-westward of, the lights south-eastward of Fort Thornton.

Two radio masts are situated about 1½ and 2 cables south-eastward of Fort Hayes.

Four radio masts, 70 feet ($21^{m}3$) high, are situated about half a cable westward of Fort Hayes, with four similar masts standing about 1½ cables south-westward of them.

A black and white spar buoy, is moored north-westward of the shoals off Georgetown, in a position about 6½ cables north-westward of Catherine point.

A black and white spar buoy, is moored north-eastward of the shoals off Georgetown, in a position about 3½ cables north-westward of Fort Thornton.

There are several mooring buoys in Clarence bay for the use of the island steamboat and of the lighters; also two buoys are moored off the wharf for waiting boats to secure to, it being unsafe to remain alongside the landing steps longer than is absolutely necessary.

Anchorage.—The best position in which to anchor is, in a depth of 10 or 11 fathoms ($18^{m}3$ or $20^{m}1$), with the lights or beacons near Redpole monument in line, bearing about 139°, and the light or beacon near Catherine point bearing about 181°; from this position Pyramid rock should bear about 043°. Pyramid rock should not be brought to bear less than 040°, nor should the northern end of the Long beach of Clarence bay be brought to bear less than 085°, which latter bearing just clears the shoals off Georgetown. Some old moorings foul the bottom between the above anchorage and the position of the mooring buoys for lighters in Clarence bay. Catherine point (*Lat. 7° 56′ S., Long. 14° 25′ W.*) should not be used for fixing the vessel's position, nor for a cross bearing by which to anchor, as it consists of detached rocks with no definite extremity.

On anchoring a good scope of cable should be veered, as sometimes the wind blows with strength off the high land. Vessels usually lie at single anchor heading towards the land, but instances have occurred when they have tailed inshore, and as they are almost continuously rolling it is necessary, when selecting a berth, to bear this fact in mind.

Anchorage southward of the outer buoy or of the shoals off Georgetown is unsafe, and rollers sometimes prevent landing in that vicinity for several days in succession.

Owing to the existence of cables therein, vessels are prohibited from anchoring in the area, indicated by pecked lines on the plan, between Bates and Pyramid points.

Chart 1691.

Current.—The general movement of water in the vicinity of Ascension island is between south-west and north-west. The pre-

Chart 1691.

dominant set is in a 270° direction at 0·5 to 0·6 knots, the higher rate occurring during August, September, and October.

Directions.—Approaching Clarence bay from northward, the coast should be given a berth of at least half a mile. When the leading beacons or lights are in line anchorage may be obtained as described above.

Approaching from southward or westward, the shoals off Georgetown should be avoided by keeping outside the outer buoy by bearings of Pyramid point (*Lat. 7° 55′ S., Long. 14° 24′ W.*).

Chart 1691, plan of Clarence bay.

Georgetown.—The buildings of this settlement stand, facing the sea, high above the beach southward and westward of Fort Thornton (*Lat. 7° 56′ S., Long. 14° 25′ W.*); there is a canteen and a small hospital.

There is a 20-ton steam crane at the head of the wharf at Georgetown, and also a steam hoist fitted with 1½-ton Temperley transporters.

Supplies are not available for shipping.

Ascension is connected to the general telegraph system.

There is occasional steamship communication with Europe and South Africa.

Climatic table.—*See* page 81.

Wharf.—Landing.—Rollers.—Landing is effected at a wharf, 70 feet (21^{m}3) in length, with a depth alongside of 10 feet (3^{m}0), situated close westward of Fort Thornton; but great caution is necessary on account of the rollers.

These phenomena, which take the form of either south-westerly or north-westerly rollers, may be expected about once a fortnight, and are sufficient to prevent lighters lying alongside the wharf. The single roller has a height, as measured on the steps at the wharf, of 5 ft. 3 in. (1^{m}6), and the double roller of 10 ft. 6 in. (3^{m}2). When single rollers are running, landing may still be effected, but difficulty is then often experienced in getting alongside the steps, and great caution should be exercised.

The third successive roller is generally the heaviest, and the moment it has passed, the boat should shoot in close round Tartar rock, situated close northward of the head of the wharf, steering well to the left of the steps; when close to the rocks outside the steps, a sharp turn to starboard should be made and the boat will be carried up to the latter by the set between Tartar rock and the bluff on which stands Fort Thornton.

On the eastern side of Clarence bay, the depths offshore are sufficient to prevent the swell acquiring the character of breaking rollers, except in cases where the undulation arrives from north-westward, and breaks directly upon the island; even then, the guard ship formerly moored in a position about 3 cables north-north-eastward of Fort Thornton was never disturbed at her moorings in a depth of 9 fathoms (16^{m}5), which would tend to demonstrate that in the very worst cases the rollers do not break at that depth.

The heaviest rollers occur when they synchronise with the full or change of the moon.

The following table gives the average number of days on which rollers occurred in each month during the periods 1904 to 1911, in-

Chart 1691, plan of Clarence bay.

clusive, and November 1912 to June 1914, inclusive. It is noticeable that no double rollers occurred during the latter period.

Month.	1904–1911.				Nov. 1912–June 1914.			
	S.W. Rollers.		N.E. Rollers.		S.W. Rollers.		N.E. Rollers.	
	Single.	Double.	Single.	Double.	Single.	Double.	Single.	Double.
January .	0	0	3	1	2	0	12	0
February .	2	0	1	0	2	0	6	0
March . .	2	0	2	0	2	0	4	0
April . .	4	1	1	0	4	0	6	0
May. . .	4	1	0	0	7	0	0	0
June . .	7	1	0	0	13	0	0	0
July . .	6	1	0	0	2	0	0	0
August . .	7	2	0	0	2	0	0	0
September .	4	0	0	0	0	0	0	0
October .	3	0	1	0	3	0	5	0
November .	3	0	2	0	6	0	3	0
December .	2	0	6	1	3	0	6	0

The following remarks are based on a report furnished by the Commandant, Captain Carpenter, R.M.L.I., in 1911 :—

South-westerly rollers form at a position slightly westward of the outer spar buoy, and turning off from the direction of the south-westerly swell, travel towards Clarence bay along a line close southward of, and parallel with, that of the buoys. There is always a heavy swell at the wharf during south-westerly rollers, but as they arrive in series with calm intervals lasting from 5 to 7 minutes, it is usually possible, by waiting for a favourable opportunity, to get a boat alongside for a few minutes. Occasionally parts of the south-westerly rollers become detached and, pivoting round at right angles, break on the rocky point under Hayes hill and against the wharf. This generally occurs when double rollers are running, and makes it absolutely impossible to use the landing place. Double south-westerly rollers break at two other points, firstly on crossing the 5-fathom (9^{m}1) line, and secondly in the vicinity of the detached 2½ to 3-fathom (4^{m}6 to 5^{m}5) patch off Hayes hill (*Lat. 7° 56′ S., Long. 14° 25′ W.*).

North-easterly rollers turn off from the direction of the north-easterly swell and, approaching the coast from a more northerly direction, increase in height as they near the shore, only breaking when they are from about half a cable to three-quarters of a cable offshore. The shoals north-westward of the wharf appear to subdue the approaching north-easterly rollers which arrive at the wharf in the form of an ordinary swell, it being then quite possible to use the landing place, and as long as the swell is not very heavy even lighters can be taken in and unloaded by making use of the long arm of the Temperley transporter.

A combination of north-easterly and south-westerly rollers, which occurs at the most only twice in the year, raises a nasty lumpy sea extremely dangerous to boats. On these occasions a pyramidal mass of water, some 12 to 15 feet (3^{m}7 to 4^{m}6) in height, may rise in the direct track of boats making for the wharf from the roadstead, and break about a quarter of a cable north-westward of Tartar rock (*Lat. 7° 56′ S., Long. 14° 25′ W.*).

Charts 2202a, 2203, 2127, 2483.

Chart 1691, plan of Clarence bay.

Neither south-westerly nor north-easterly rollers break in the vicinity of the anchorage, nor in that of the lighter's mooring buoys; but they cross these areas in the form of a heavy swell, the effect of which diminishes as the distance offshore is increased. Thus the swell at the anchorage is not nearly so heavy as that at the lighters mooring buoys, and lighters can always be used by vessels lying at the anchorage although at the same time communication with the shore may be impossible. *See* also pages 35 and 36.

Chart 1691.

Northern and eastern coasts.—From Pyramid point, the northern coast of Ascension island curves north-eastward for about 2 miles to North point, which latter should be given a good berth as foul ground extends in a northerly direction for about 2 cables from it.

Chart 1691, plan of English bay.

English bay is situated immediately westward of North point. Almost in the centre of its entrance, which is about 3 cables wide, there is a shoal head, over which is a depth of 3¼ fathoms ($5^{m}9$), lying just inside depths of 10 fathoms ($18^{m}3$). There is a landing place on the southern side of the bay, and a small buoy, for the use of the turtle boats is moored off it during the season, January to April, inclusive.

Chart 1691.

From North point, the coast trends in a south-easterly direction for about 1½ miles to Porpoise point, and thence in the same direction for about 1¼ miles to North East point. Foul ground extends about half a cable off both these points, and over one cable offshore in places in the bight between them. East Crater rises to an elevation of 743 feet ($226^{m}5$) about one mile south-westward of Porpoise point; *see* view facing page 336.

Chart 1691, plan of North East bay.

North East bay is situated westward of a point, off which foul ground extends about half a cable, situated about 3 cables westward from North East point; there is a landing place on the eastern side of the bay, off which a buoy is moored for the use of the turtle boats during the season. It is said that rollers only enter the bay about six times in the year.

Chart 1691.

From North East point, the coast trends in a south-easterly direction for about 3¼ miles to South East head, and is high, inaccessible, and iron-bound, with deep water close off it. Boatswain Bird islet which is 323 feet ($98^{m}4$) high, and Boatswain Bird rocks which have depths of less than 6 feet ($1^{m}8$) over them, lie about one-quarter of a mile offshore one mile and three-quarters of a mile, respectively, north-westward of South East head.

Chart 1691, plan of North East bay.

Anchorage.—Anchorage, fairly sheltered from the prevailing south-easterly wind, may be obtained in North East bay, vessels being guided by the chart.

Chart 1691.

Southern and western coasts.—From South East head, the southern coast of Ascension island trends in a general west-south-westerly direction, with several indentations, for about 6½ miles to South point (*Lat. 8° 00′ S., Long. 14° 24′ W.*). Whale point is a small projection about 3½ cables south-south-westward of South East head.

Chart 1691.

South East bay is contained between Whale point and Unicorn point, situated 1½ miles farther south-westward. Between Unicorn point and White Bluff, about 1½ miles west-south-westward are two small bays, known as Crystal bay and Cocoanut bay. Pillar bay lies about three-quarters of a mile westward of White Bluff, two rocks, 140 feet ($42^{m}7$) and 107 feet ($32^{m}6$) high known as Pillar rock, are situated in this bay. Gannet bay, which is fouled by many rocks, lies about 3½ cables north-eastward of South point.

The whole of this portion of the coast is high, inaccessible, and iron-bound, and being exposed to the full force of the South-east Trade winds, the sea breaks upon it with great violence.

There are several islets or rocks close off South point; and about half a mile westward of the point, in the southern approach to Mars bay, there is another islet lying about 1½ cables offshore, with a rock awash one cable eastward of it.

South Pyramid is a conspicuous rock, 48 feet ($14^{m}6$) high, situated on the point in the southern approach to Mars bay.

From South point, the coast trends north-westward for about 1¾ miles to Portland point, which is steep-to and is the southern entrance point of South West bay.

Chart 1691, plan of South West bay.

McArthur point, the northern entrance point to this bay, is situated about 9 cables northward of Portland point and shoal water extends about 1½ cables westward from it.

South West bay has a fine sandy beach, behind which is a steep lava cliff, the highest point of which latter rises to an elevation of 246 feet ($75^{m}0$). Commencing at a distance of about half a mile inland from the bay, there is a smooth plain of considerable dimensions the soil of which is very rich, but so dry and dusty as seldom to exhibit any other verdure than a small amount of an annual herb named purslane. Northward of this plain, South West Bay Red hill rises to an elevation of 731 feet ($222^{m}8$), and southward of it is Saddle crater, 422 feet ($128^{m}6$) high; both of these hills are conspicuous. In the vicinity of Saddle crater there are several conical hills. The bay is much frequented by turtle between the months of November and June.

Chart 1691.

From McArthur point (*Lat. 7° 58′ S., Long. 14° 25′ W.*), the coast trends northward for about 1¾ miles to Catherine point, and presents a succession of small points which include Payne point, Stackpole point, Pratt point and Collyer point; there are depths of 5-fathoms ($9^{m}1$) about 2 cables off this stretch of coast.

Chart 1691, plan of South West bay.

Anchorage.—There would appear to be fair anchorage in South West bay, which is to a great extent free from north-easterly rollers.

Chart 1771.

ST. HELENA ISLAND.—General remarks.—This famous island is situated in the South Atlantic ocean, at a distance of about 1,700 miles from the Cape of Good Hope and 703 miles from the island of Ascension. It lies between the parallels of 15° 54′ S. and 16° 01′ S., and the meridians of 5° 38′ W. and 5° 48′ W.

The maximum length of the island is 9½ miles, and its width 6 miles. Landing is almost impracticable, except on the north-western or

Charts 2202a, 2203, 2127, 2483.

Chart 1771.

leeward side of the island, though in very favourable weather it may be effected in Prosperous and Sandy bays, situated respectively on its eastern and southern sides. *See* page 335.

The estimated population of the island, on 31st December 1949, was 4,664.

Aspect.—At a distance of about 60 miles, St. Helena resembles a huge pyramidal-shaped fortress rising abruptly from the sea; from afar no signs of vegetation are visible, but on nearer approach the valleys and the summits of the hills are seen to be clothed in verdure in striking contrast to the precipitous and almost inaccessible cliffs which form the coast line. These cliffs, from 1,000 to 1,800 feet ($304^{m}8$ to $548^{m}6$) in height, are intersected by chasms which serve as outlets for the streams flowing from the high lands of the interior and terminate in small coves more or less exposed to the fury of the waves. *See* views facing page 336.

The island is divided into two unequal parts by a ridge of mountains from 2,000 to nearly 2,700 feet ($609^{m}6$ to $823^{m}0$) high, extending in a curve from Castle Rock point, the southernmost point of the island, to Stone Top point (*Lat. 15° 59′ S., Long. 5° 39′ W.*), near its south-eastern extremity. The principal eminences in this range are: Mount Actaeon, 2,685 feet ($818^{m}4$) high, the highest point in the island; Diana's peak, 2,604 feet ($793^{m}7$) high; and High peak, 2,616 feet ($797^{m}4$) high; whilst near the northern end of the island, Flagstaff hill rises to an elevation of 2,275 feet ($693^{m}4$).

Numerous spurs radiate from the central range of mountains and terminate, on reaching the sea, in the precipitous cliffs remarked on above, whilst the intermediate valleys slope down to the coves. The spurs on either side of the south-western part of the range are suddenly broken at about half a mile from the ridge, apparently the result of a subsidence which has left, here and there, towering fragments of basalt. These isolated masses are the evident results of some volcanic disturbance, and several of them are of curious and fantastic shape. Two of the most remarkable are situated on the southern side of the range and are named Lot and Lot's Wife; they are both formed of strangely contorted columnar basalt, and are 197 and 160 feet ($60^{m}0$ and $48^{m}8$) in height, respectively, whilst their summits are at elevations of 1,491 and 1,516 feet ($454^{m}5$ and $462^{m}1$).

Along the southern coast of the island, westward of Sandy bay, there stretches for a considerable distance a horizontal stratum of columnar basalt which forms a stupendous wall 50 to 180 feet ($15^{m}2$ to $54^{m}9$) high. The Chimney, a remarkable hexagonal column of basalt, 64 feet ($19^{m}5$) high, is an isolated portion of this wall, situated close inshore about three-quarters of a mile westward of Sandy bay.

The remains of a vast crater can be traced between Flagstaff hill and The Barn, a mountain 2,028 feet ($618^{m}1$) high, in shape resembling a building of that kind, and situated at the north-eastern end of the island. *See* view on chart 1771.

Off-lying dangers.—Barn ledge is a small detached rocky shoal, with a least depth over it of 3½ fathoms ($5^{m}9$) and depths of from 9 to 12 fathoms ($16^{m}5$ to $21^{m}9$) within one cable of it all round; it lies about 8 cables offshore and one mile south-eastward of Barn Long point, the north-easternmost extremity of the island. This dangerous ledge is generally marked by a heavy ground swell.

Charts 2202a, 2203, 2127, 2483.

Chart 1771.

George islet, a detached rock, lying about half a mile south-eastward of Gill point near the eastern end of St. Helena bearing more than 178°, and well open eastward of King and Queen point (page **337**), the eastern extremity of the island, leads eastward of Barn ledge.

Sugar-loaf point, the northern extremity of St. Helena bearing less than 279°, and open northward of the northernmost part of the coast under The Barn, leads northward of Barn ledge.

Speery ledge is a small reef of pointed rocks, with depths of from 3 to 4 fathoms (5^m5 to 7^m3) over them, lying about 9 cables southward of the summit of Speery islet, which latter is situated about half a mile south-westward of Castle Rock point, the southern point of St. Helena (page **333**). Between Speery ledge and the rocks in the vicinity of Speery islet there are depths of from 24 to 35 fathoms (43^m9 to 64^m0). It was reported, in 1945, that the 100-fathom (182^m9) line in the vicinity of Speery islet extended farther south-westward than is shown on the chart.

Gill point (*Lat. 15° 58′ S., Long. 5° 38′ W.*) (page **337**), bearing less than 051°, and open eastward of Long Range point, situated about 3 miles south-westward of it, leads south-eastward of Speery ledge.

With the exceptions of Barn and Speery ledges there are no known sunken dangers off the coasts of St. Helena.

Current.—The general movement of water in the vicinity of St. Helena is between South and North-west. The predominant set is in about a 280° direction from May to October, and in about a 265° direction from November to January. The mean rate is slightly over half a knot.

Chart 1769, plan of James and Rupert's bays.

James and Rupert's bays.—James bay, the port of St. Helena, is a small indentation on the north-western or leeward side of the island, and at about half a mile north-eastward of it is a similar bay, named Rupert's bay. Deep valleys descend between steep rocky hills to the heads of these bays; Rupert's valley is flanked on its north-eastern side by Rupert's hill, 1,350 feet (411^m5) high, and the two valleys are separated by a ridge which rises from Munden point, situated between the two bays, to a height of 930 feet (283^m5). The valley descending to James bay, in which is the settlement of Jamestown, is flanked on its south-western side by a ridge which descends from High knoll, its summit, to Ladder hill, where it terminates abruptly in a stupendous perpendicular cliff facing the sea. On the summit of Ladder hill are the artillery barracks, the ascent to which is made by a well-engineered zig-zag road, or by 699 steps leading straight up from the town. *See* view on chart 1771.

In 1941, a white cottage standing about 1¾ cables south-eastward of Munden point was conspicuous.

There is a rifle range on Ladder hill; a black ball over a square red flag is displayed on Ladder Hill flagstaff, and a red flag at the butts flagstaff, when firing is in progress.

Light.—**Buoys.**—A light is exhibited from a post situated at the northern end of the wharf in James bay.

A spherical buoy with black and white vertical stripes and a tripod and staff carrying a black topmark with the word "cable" thereon in white letters is moored about 4 cables north-north-westward of the extremity of Munden point. (*Lat. 15° 55′ S., Long. 5° 43′ W.*).

Charts 2202a, 2203, 2127, 2483.

Chart 1769, plan of James and Rupert's bays.

A number of mooring buoys for the use of the coal and water lighters lie off the wharf in James bay.

Anchorage.—Anchorage is prohibited in the approaches to Rupert's bay, with a notice board on Munden point bearing more than 155°, on account of the existence of cables; the western limit of this prohibited anchorage is indicated by a pecked line on chart 1769.

Off James bay, anchorage may be selected as convenient, but not in depths of less than 17 fathoms ($31^{m}1$) on account of the rollers, *see* page 339; the bottom in the roadstead is coarse sand and gravel.

A large vessel intending to remain for any length of time should anchor northward or north-westward of Ladder Hill point. No. 1 berth, the best sheltered, with depths of from 17 to 19 fathoms ($31^{m}1$ to $34^{m}7$), is north-westward of the point with St. James' church spire in line with Sampson's battery, about 4¾ cables east-south-eastward of it, bearing about 119°, and Sugar-loaf summit bearing 058°, or Munden point in line with the south-western entrance point of Rupert's bay, bearing about 073°. Should this berth be occupied, No. 2 berth, in a depth of about 20 fathoms ($36^{m}6$), is the next best, with St. James' church spire in line with the junction of the roads up Ladder hill, which are walled and clearly seen, about 3½ cables south-south-eastward of the church, bearing about 158°, and Sugar-loaf summit in line with the southern edge of the battlement at Banks point, about 3½ cables west-south-westward of it, bearing about 060°. No. 1 berth is preferable for working cargo as, although it is further from the cranes, work proceeds more quickly on account of it being more sheltered.

A smaller vessel can anchor in No. 3 berth, a little closer inshore, in a depth of about 19 fathoms ($34^{m}7$), with St. James' church spire in line with St. John's church, about 6¼ cables south-eastward of it, bearing about 142°, and the light-structure on the wharf in line with the conspicuous white cottage on Munden hill bearing about 093°.

All three berths are well clear of the wreck lying about 3½ cables north-north-westward of Ladder Hill point, but No. 2 berth is only about 120 yards south-westward of the foul anchorage shown on the chart about 2¼ cables north-westward of Munden point (*Lat. 15° 55′ S., Long. 5° 43′ W.*).

Landing places.—The only landing places on St. Helena, where landing can be effected at practically all times, are in Rupert's and James bays. Landing in ships' boats can usually be effected at the wharf in James bay, but the swell becomes heavy for about two days at the full or change of the moon; it is then better to lie off the landing place and make use of the shore boats. *See* also remarks on rollers, page 339.

Tidal streams.—The tidal stream in James bay is said to set northward during the rising tide and south-westward during the falling tide.

Chart 1769, plan of James and Rupert's bays, 1771.

Directions.—If approaching the anchorage from northward or eastward, Barn ledge having been cleared, *see* page 333, Sugar Loaf point may be passed at a distance of one cable and the north-western coast of the island, being steep-to and without off-lying dangers, may also be approached equally near.

If approaching from southward or westward, Speery ledge having been cleared, *see* page 334, and West point rounded, vessels may steer along the coast at a prudent distance and make for the anchorage.

Chart 1769, plan of James and Rupert's bays, 1771.

Caution.—The prevailing south-easterly wind blows down James and Rupert's valleys in violent squalls. Off Banks point, situated three-quarters of a mile north-eastward of Munden point, the wind is deflected by the high land and blows along the north-eastern coast of the island and round Sugar Loaf point, so that at one moment it is north-easterly and the next southerly, causing a confused sea in this vicinity.

Chart 1769, plan of James and Rupert's bays.

Jamestown.—This settlement is entered from its seaward side through a covered gateway, within which on the left hand are the Government offices, whilst on the right hand is St. James church which has a remarkable slender spire (*Lat. 15° 55′ S., Long. 5° 43′ W.*) forming a conspicuous object when seen from the anchorage. The town extends the whole length of the valley, which gradually decreases in breadth as it recedes from the coast. The residences of the principal inhabitants are built on the higher and cooler parts of the island. There are two hospitals, one with 36 and the other with 17 beds, and a post office at Jamestown. *See* view facing page 337.

The population, in 1941, was about 1,500.

Communications.—St. Helena is connected to the general telegraph system; Jamestown is connected by telephone to other parts of the island.

There is occasional steamship communication with Europe and South Africa.

Shipping.—Trade.—24 merchant vessels called at Jamestown in 1949. The principal exports are fibre and tow; they totalled 1,810 tons in 1949.

Climatic table.—*See* page 82.

Port facilities.—There is a concrete wharf, 300 feet (91^m4) long, on the north-eastern side of James bay, with a depth alongside of 10 feet (3^m0).

There is also a short jetty close southward of the wharf.

No stocks of bunker coal are now maintained.

The loading and discharging of cargo is carried out by means of lighters, but it is much impeded when rollers set in.

On the northern end of the quay are a 2-ton hand crane and two 3½-ton power cranes; on the southern end of the quay there is a 7-ton hand crane.

Fresh provisions are obtainable, and water can be supplied in a 15-ton tank vessel.

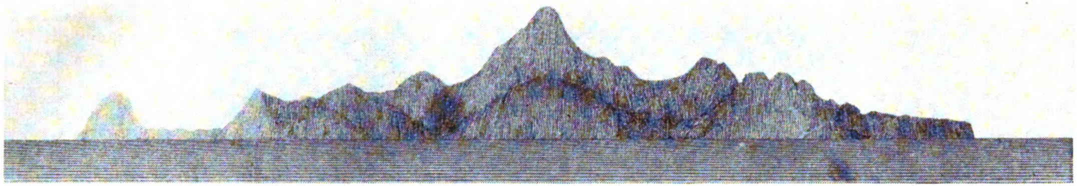
There are a few large lighters and some smaller ones.

Pratique regulations.—No boat, except the Health Officer's boat, is permitted to go alongside any in-coming vessel which intends to anchor. Any vessel which intends to anchor must show a yellow flag at the foremast head. When pratique has been granted, the yellow flag is hauled down to indicate that intercourse between the vessel and the island is permitted.

Any vessel placed in quarantine shall continue to show the yellow flag at the foremast head by day, and by night she shall exhibit, from the foremast, *two white* lights in a vertical line, one over the other, at a distance apart of not less than 4 feet (1^m2) or more than 6 feet (1^m8).

Masters of vessels arriving at the port are not to leave, or permit

Charts 2202a, 2203, 2127, 2483.

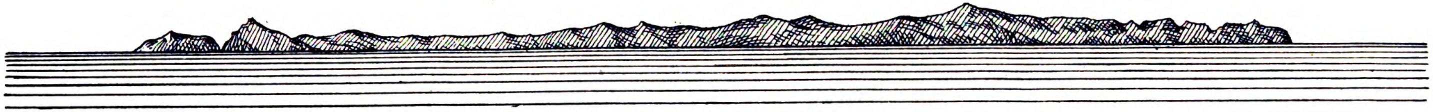


East crater.

Green mountain, bearing 131°,
distant 9 *miles.*

Ascension island from north-westward.

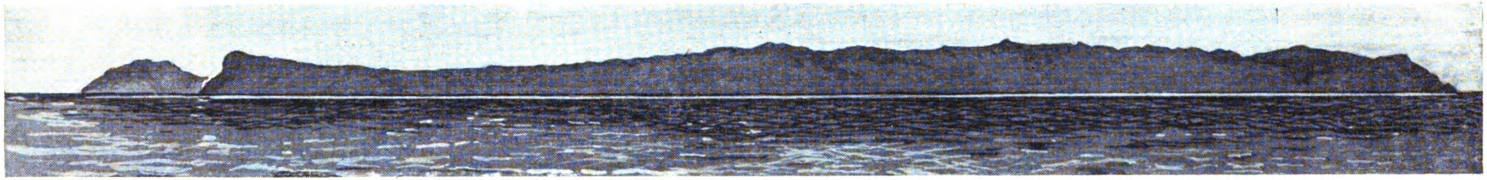
(*Original dated* 1871.)



North-eastern coast, distant 28 *to* 30 *miles.*

St. Helena island from north-eastward.

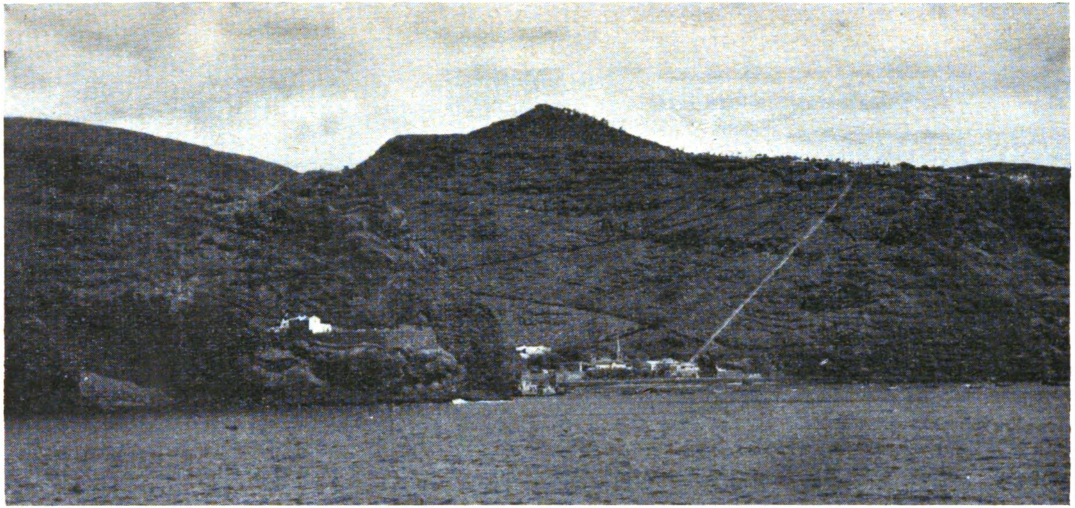
(*Original dated* 1872.)



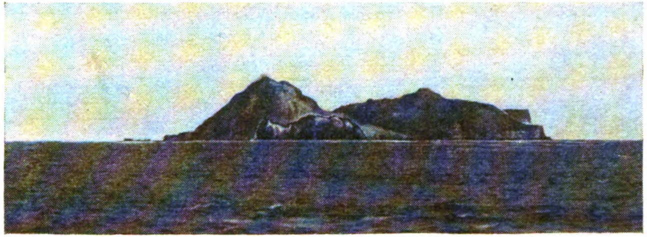
St. Helena island from west-north-westward.

(*Original dated* 1940.)

To face page 337.



Jamestown, St. Helena, from northward.
(*Original dated* 1938.)



Nightingale island from north-westward.
(*Original dated* 1904.)

Chart 1769, plan of James and Rupert's bays.

any other person to leave, their vessel, either to go onshore or on board any other vessel in the harbour, before receiving pratique from the Health Officer or Harbour-master.

Vessels which do not intend to anchor, but which require fresh provisions, can obtain them through licensed traders.

Chart 1771.

North and East Coasts. — Anchorages. — Landings. — Islets. —From Banks point (page 336), situated about 8½ cables north-eastward of Munden point (*Lat. 15° 55′ S., Long. 5° 43′ W.*), the coast trends north-north-eastward for about 3 cables to Buttermilk point, and thence eastward for about half a mile to Sugar Loaf point, the northern extremity of the island.

Flagstaff bay is contained between Sugar Loaf point and an unnamed point 2 miles east-south-eastward. Though the bay has not been thoroughly examined, the indications are that it is fairly steep-to and is clear of known dangers.

From the eastern entrance point of Flagstaff bay, the coast runs east-south-eastward for three-quarters of a mile to Barn Long point (page 333), the north-eastern extremity of the island, and thence for a quarter of a mile southward to Barn point. Turks Cap bay is entered between Barn point and Scraggy point about half a mile southward.

Black point, which is situated about 1½ cables south-eastward of Scraggy point, is the northern entrance point of Prosperous bay, the southern entrance point being Bay point, about three-quarters of a mile farther south-south-eastward.

There is anchorage in Prosperous bay, in a depth of about 12 fathoms ($21^{m}9$), about 2 cables offshore. The original landing place of the English expedition in 1672 was at the southern end of Prosperous bay, close westward of Bay point.

King and Queen point (*Lat. 15° 57′ S., Long. 5° 38′ W.*), the eastern extremity of the island, also known as Saddle point, is situated about three-quarters of a mile south-eastward of Bay point, the intervening coast being steep-to.

Gill point is situated nearly 1½ miles southward of King and Queen point, the intervening coast forming an indentation which has not been examined, and which includes a small bay known as Dry Gut bay. Shore islet is situated about one cable south-south-eastward of Gill point, with George islet 3 cables farther south-south-eastward.

Southern coast.—Landing.—Islets.—Stone Top bay, which has not been examined, is contained between Gill point and Stone Top point, situated one mile south-westward.

Rough rock is a point on this precipitous part of the coast, situated about 6 cables south-westward of Stone Top point. Two small islets, known as Rough Rock islet and Flat rock, are situated respectively, 1½ cables eastward and 4 cables west-south-westward, of Rough rock. There is an unexamined indentation in the coast between Rough rock and Long Range point, situated 1¼ miles south-westward, and at the head of the indentation is Deep Valley bay.

Powell point is situated about 8½ cables west-south-westward of Long Range point and the indentation between the two points contains two small bays called Long Range cove and Powell bay. Two rocks, known as The Buoys, are situated about 2 cables south-eastward of Powell point.

Charts 2202a, 2203, 2127, 2483.

Chart 1771.

Horse's Head is a projection on the coast situated about 14 cables westward of Powell point, with White Hill point located midway between the two.

Sandy bay is contained between Horse's Head and Crown point, 1½ cables northward. There is a landing place on the south-western shore of the bay and an old battery is situated on its northern shore. Potato bay lies close north-eastward of Crown point, and Sandy Bay islet is situated about a quarter of a mile offshore and 3½ cables eastward of Horse's Head.

Castle Rock point (*Lat. 16° 01′ S., Long. 5° 45′ W.*), is 540 feet ($164^{m}6$) high and is situated about 2¼ miles south-westward of Horse's Head, the intervening coast being precipitous and apparently steep-to, though it has not been thoroughly sounded; *see* view on Chart 1771. There are a number of small off-lying rocks up to half a cable offshore, including The Chimney, Lot's Wife Ponds, and White Bird islet. Robert rock is a small islet situated about 2 cables southward of Castle Rock point, and has two small rocks lying close northward and southward of it.

The Jar and Flat rock lie, respectively, one cable south-eastward and south-westward, of Castle Rock point.

Speery islet (page 334) is situated about half a mile south-westward of Castle Rock point, with Flat rock and Salt rock about one cable north-eastward and eastward, respectively. The Needle lies close inshore about 1½ cables north-westward of Castle Rock point.

Lower Black rock, 140 feet ($42^{m}7$) high, and Upper Black rock, 160 feet ($48^{m}8$) high, are situated, respectively, 3½ and 5 cables west-north-westward of Castle Rock point.

West Coast.—Anchorages.—Islets.—Rainy point is situated about 2 cables northward of Upper Black rock, with Old Father point 7 cables farther north-north-westward. Manati bay, the head of which is fouled by rocks, lies eastward of Old Father point. Old Joan point is situated about 8 cables west-north-westward of Old Father point, Shepherd's Hole being a small indentation close eastward of Old Joan point.

New point is situated 5½ cables north-westward of Old Joan point; Bird islet lies midway between these points and about one cable offshore.

West point, the western extremity of the island, is situated about 4 cables west-north-westward of New point. Egg island (*Lat. 15° 58′ S., Long. 5° 46′ W.*), which is 288 feet ($87^{m}8$) high, is situated about 1¾ miles north-eastward of West point. Black rock and Thompson's Valley islet lie in Thompson's bay about one mile north-eastward of West point. Peaked islet lies about one cable offshore and 2 cables south-westward of Egg island.

Anchorage is to be obtained in about 20 fathoms ($36^{m}6$) about 2 cables north-westward of Egg island.

Bennetts point is situated about 6 cables north-eastward of Egg island, and a small cove called Dry Gut bay lies three cables farther north-north-eastward.

It should be remembered that there is also a Dry Gut bay on the eastern side of the island, *see* page 337.

Lighter rock lies about 1½ cables offshore and the same distance northward of Dry Gut bay. Horse Pasture point, near which there

Charts 2202a, 2203, 2127, 2483.

Chart 1771.

stands the ruins of a tower, is situated about 4 cables north-eastward of Lighter rock.

Long Ledge is a narrow reef extending in a north-westerly direction from the coast for about 1½ cables offshore from a position about 6 cables north-eastward of Horse Pasture point. The Lion is an isolated above-water rock situated about 4½ cables north-eastward of Horse Pasture point.

Lemon Valley bay (*Lat. 15° 56′ S., Long. 5° 45′ W.*) is about 7 cables east-north-eastward of Long Ledge, with Hickshall point about one mile farther north-eastward.

Ladder Hill point, which is described on page 334, is situated about half a mile north-eastward of Hickshall point (*Lat. 15° 56′ S., Long. 5° 44′ W.*).

Anchorage may be obtained, in depths of 15 to 28 fathoms ($27^{m}4$ to $51^{m}2$) at distances of from 2 to 4 cables offshore, anywhere off the coast between Lemon Valley bay and Ladder Hill point; *see* also page 333.

Rollers.—The most singular phenomenon connected with this part of the ocean is the setting in of very heavy continuous swells or rollers from north-north-westward which are most prevalent during the months of January and February, when the waves break on the leeward coast of St. Helena with astonishing grandeur. During their continuance, landing in ships' boats is dangerous, and shore boats only should then be used.

These rollers rise without any apparent cause for, as a rule, the weather is fine and the wind light. In the old days, many lives were lost in consequence of ships' boats being capsized, and in February, 1846, 13 small vessels moored near the shore were driven from their moorings and totally wrecked, and the wharves and low-lying batteries also suffered considerable damage. If a vessel is moored in a depth of 17 fathoms ($13^{m}1$) however, there is no danger as the rollers only commence to be dangerous within a cable of the shore; in 1921, one of H.M. vessels was able to coal whilst the rollers were setting in.

The following table, compiled from observations taken at the landing place in James bay between the years 1891 and 1898, shows the annual average number of days in each month on which the sea was as described in the headings:—

Month.	Calm.	Slight swell.	Heavy swell.	Rollers.
January	6·1	13·6	6·5	4·8
February	4·0	10·0	9·0	5·0
March	11·8	13·0	5·0	1·2
April	11·0	13·5	5·0	0·5
May	13·0	12·0	3·7	2·3
June	9·5	17·0	2·5	1·0
July	11·0	15·5	3·5	1·0
August	15·7	10·0	3·5	1·8
September	10·0	16·0	3·4	0·6
October	8·0	15·0	7·0	1·0
November	10·0	9·6	8·4	2·0
December	6·1	14·7	6·8	3·4

See also page 330.

Charts 2202a, 2203, 2127, 2483.

Chart 1769.

TRISTAN DA CUNHA GROUP.—These islands, five in number, are situated at the angles of an isosceles triangle lying between the parallels of 37° 02′ S. and 37° 25′ S., and the meridians of 12° 12′ W. and 12° 42′ W.

Tristan island, the largest and north-eastern island, is situated at the apex of the triangle. Inaccessible island, the next in size, is situated at the south-western angle, and at a distance of about 17½ miles south-westward of Tristan island. Nightingale, Middle, and Stoltenhof islands are situated close together at the southern angle, about 16¼ miles south-south-westward of Tristan island, and about 10 miles south-eastward of Inaccessible island.

Tristan island.—Aspect.—Dangers.—This island is in the form of a truncated cone, its sides rising at an angle of about 45° to a central peak about 6,760 feet (2,060$^{\text{m}}$4) high.

The island is steep-to all round outside a distance of one mile from the coast.

Reefs extend from Sandy point, the eastern extremity of the island; also from Stonyhill point, at the southern end of the island, and from South point, about one mile west-south-westward; and from Crawford point, also known as Cave point, the south-western extremity of the island.

A shoal, the position of which is approximate, lies about 7 cables eastward of Stonyhill point, and another has been reported about 9 cables farther eastward; a reef lies about 2¼ miles north-eastward of Stonyhill point, and about 4 cables offshore.

A shoal, the position of which is approximate, was reported, in 1936, about half a mile north-westward of Anchorstock point, the western extremity of the island.

There are three shoals at distances of from 3 to 5 cables off the south-western side of the island.

The island is practically surrounded by a belt of kelp.

The sides of the island consist of walls of inaccessible cliffs from 1,000 to 2,000 feet (304$^{\text{m}}$8 to 609$^{\text{m}}$6) in height, which rise, except on its north-western side, directly from the sea; on this side there is, in front of the cliffs, a comparatively low and grassy slope, from 100 to 200 feet (30$^{\text{m}}$5 to 61$^{\text{m}}$0) high, which terminates in Herald point (*Lat. 37° 03′ S., Long. 12° 19′ W.*), also known as Hottentot point, the north-western extremity of the island. The sides of the mountain mass as far as the central dome are covered with brushwood, intermixed with ferns and long grass; but above 5,000 feet (1,524$^{\text{m}}$0), coinciding with the normal upper level of the clouds, the mountain consists of loose stones and volcanic rubble, with occasional rocks and boulders, the summit itself being usually decked with icicles and covered by snow in winter. *See* view on chart 1769.

Chart 1769, plan of Tristan settlement.

Falmouth and Quest bays.—Herald point is about 60 feet (18$^{\text{m}}$3) high and cliffy, and eastward of it on the northern side of the grassy slope remarked on above are two indentations, the western of which is Falmouth bay and the eastern, entered between Julia and Black Cliff points, is Quest bay.

Hardy rock and Pin rock lie close offshore about 2 miles and one mile south-westward, respectively, of Herald point; the former is 120 feet (36$^{\text{m}}$6) high.

Charts 2202a, 2203, 2127, 2483.

Chart 1769, plan of Tristan settlement.

Julia reef extends in a northerly direction for about 1½ cables from Julia point; and rocks fringe the coast in the vicinity of Black Cliff and Herald points.

A 3-fathom ($5^{m}5$) patch lies about 1¼ cables north-westward of Julia point (*Lat. 37° 03′ S., Long. 12° 18′ W.*).

Lights.—A light is exhibited on request, whenever shipping is known to be approaching or is lying off the island after nightfall, from a white beacon situated about one cable south-south-eastward of Julia point.

A second light is similarly exhibited from a small white beacon about 3½ cables south-eastward of Julia point, or a third of the way eastward from the head of Quest bay.

Beacons.—A white square beacon 10½ feet ($3^{m}2$) in height is situated on Julia point. There is a flagstaff to seaward of the beacon and a white diamond beacon 17½ feet ($5^{m}3$) in height, about 2½ cables southward.

A white triangular beacon, point up, is situated about 6¼ cables east-north-eastward of the light-beacon; a white triangular beacon, point down, is situated 2¼ cables east-south-eastward of the last-mentioned beacon.

Anchorage.—**Caution.**—The usual anchorage, such as it is, is in a depth of about 30 fathoms ($54^{m}9$) and about one mile offshore, but in consequence of the uncertainty of the weather, none but steam vessels should venture to anchor and even they, when anchored, should keep steam at command and the cable ready for slipping at a moment's notice.

Mariners are advised to consult the islanders concerning the weather as they are reported to be able to predict changes within a very short time of their taking place when normal signs give no indication of their approach.

Anchorage can be obtained in a depth of 15 fathoms ($27^{m}4$) on the following bearings:—

The diamond beacon, a white beacon belonging to a former light, the square beacon and flagstaff adjacent to it, in line, bearing 174°.

The two triangular beacons, in line, bearing 114°.

H.M.S. *Dartmouth* anchored, in perfectly calm weather, in October, 1920, in a depth of 18 fathoms ($32^{m}9$), with the waterfall about half a mile eastward of Herald point bearing 188°.

In 1937, H.M.S. *Carlisle* anchored on three occasions with the waterfall bearing 191°, 195° and 204°, distant 6, 7½, and 8 cables, in depths of 17, 20 and 22 fathoms ($31^{m}1$, $36^{m}6$ and $40^{m}2$), respectively.

Small vessels sometimes anchor off Quest bay.

Landing.—One landing place is on the sandy beach at the head of Quest bay. There are a few sunken rocks off this beach which, with care, can be avoided, but local assistance should be obtained to avoid both them and the dangerous Julia reef. A road leads from the landing place to the settlement.

Another landing place is in Falmouth bay, on the dark pebble beach situated about one cable eastward of the waterfall. (*Lat. 37° 03′ S., Long. 12° 18′ W.*).

Boats are kept on both these beaches which are used according to the state of the surf; whatever the weather, it is usually possible to effect a landing on one beach or the other, although with a sea running

Chart 1769, plan of Tristan settlement.

from north-north-westward, north, or north-east, this will be very difficult, and launching about impossible.

Landing can easily be effected except during northerly winds or when the rollers are setting in, in both of which cases it is dangerous. Boats which can easily be hauled up on the beach should be used, and they should be steered with an oar ; heavier boats can be anchored off the beach. The surf on the beach is modified by kelp, which is so strong, and firmly rooted on the bottom, that boats can be secured to it, though they are necessarily less manageable when passing through it.

Sudden changes of weather may prevent boats regaining their vessels.

Landing can also be effected at the following places on Tristan island :—

In the indentation southward of Herald point, between that point and Glass point, which is well protected from easterly winds.

In the indentation about 3 cables north-north-eastward of Hardy rock.

Chart 1769.

In a cove known as Seal bay, situated about half a mile north-westward of South point (*Lat. 37° 09′ S., Long. 12° 17′ W.*), the southern extremity of the island.

In Stonybeach bay, close northward of Stonyhill point.

On the sandy beaches immediately adjacent, and to the northward of Sandy point, the eastern extremity of the island.

Excepting in the very worst weather, a landing with safety to life, and generally to the boat, can always be effected somewhere under the lee of the island, there being, about one mile apart, small indentations with pebbly beaches, in the steep cliffs which surround the island. An islander should, if possible, be taken on board as a guide when proceeding round the island to anchorages other than that off the settlement on account of the outlying reefs, *see* page 340.

Current.—The current generally sets north-eastward, excepting close inshore where there is a slight south-westerly drain, but it occasionally runs in the opposite direction. H.M.S. *Milford*, in 1937, experienced a set of 10 miles 050° in the last 12 hours when approaching the island from St. Helena, and also a set of 12 miles 026° during the 24 hours' run from Tristan to Gough island.

Chart 1769, plan of Tristan settlement.

Settlement.—The settlement on Tristan island is situated under the cliffs on the grassy slope which terminates in Herald point (*Lat. 37° 03′ S., Long. 12° 19′ W.*). *See* also page 26.

In 1950, it consisted of 46 substantial stone cottages, thatched with flax and straw, and some 14 stone, wood and iron buildings belonging to the ex-naval station, which are now used for administrative purposes and by the fishing company and for offices and stores.

In 1950, the population of Tristan numbered 266.

A fish-canning factory was, in 1951, in course of erection.

Potatoes, on which the islanders depend, are the chief crop, but other vegetables are also grown. Fowls, geese, mutton and beef, eggs, vegetables, milk, sheep and seal skins and a number of curios especially model island canvas boats, are usually available for sale or barter to passing vessels.

At one time the community relied upon exchanging these for flour,

Charts 2202a, 2203, 2127, 2483.

Chart 1769, plan of Tristan settlement.

biscuits, clothing, etc., but the island now has a store in connection with the fishing industry which is kept well supplied with these necessities as well as with a wide range of other goods.

Arrangements can always be made for an island boat to come off to any passing vessel, and any opportunity to despatch mails is always especially welcome.

Water is plentiful, being supplied by a spring at the back of the settlement, whence it tumbles over the cliffs forming a miniature waterfall, about 20 feet ($6^{m}1$) high, marked on the chart. This supply could be utilised by ships, their boats lying outside the surf with a hose led to the waterfall; the assistance of the islanders may always be relied upon. Water obtained from the vicinity of the settlement should be boiled before it is used for drinking purposes.

A system of piping the water was being introduced in 1951.

Communications.—There is a radio station, situated about 2 cables eastward of Herald point (*Lat. 37° 03′ S., Long. 12° 19′ W.*, which, though largely used for meteorological purposes, also communicates with vessels on 500 k/c's between the hours of 1200 G.M.T. and 1300 G.M.T. daily. Arrangements for calling at the islands, provision of weather information, etc., are handled on request.

The station is equipped with Aldis lamp signalling apparatus.

Chart 1769.

Rollers.—The following information respecting the rollers, which are occasionally experienced at Tristan island, as well as at the other islands in the South Atlantic, is derived from the islanders themselves, but unfortunately no register of the dates of their actual occurrence has been kept.

At Tristan island the rollers do not seem to be affected by lunar influences, but set in at all times during winds or calms; in the latter case they are always heavier.

Though they are more frequent during the winter months, the heaviest rollers occur in December, January, and February, three of the finest months, when they sometimes last three or four days, and this last remark, according to the account of the whalers, also applies to Gough and other islands in the southern hemisphere.

Inaccessible island.—General remarks.—Aspect.—This island is a high mass of rock with a table-summit; its highest peak, situated on the western side of the island, rises to an elevation of 1,840 feet ($560^{m}8$) and is said to be a crater with water in it. Thence the summit slopes irregularly, terminating on all sides in precipitous cliffs about 1,100 feet ($335^{m}3$) high. *See* view on chart 1769.

South hill (*Lat. 37° 18′ S., Long. 12° 40′ W.*) is a remarkable conical rocky hill, situated in front of the cliffs, on the southern point of the island, and is 1,140 feet ($347^{m}5$) high; 6 cables north-westward of it is a similar rocky cone 690 feet ($210^{m}3$) high.

The north-western coast of the island is low, and the cliffs there recede sufficiently to allow the summit to be gained without difficulty.

Considerable kelp-covered reefs extend seaward on either side of the landing place.

On the north-eastern side of the island, the coast is also low and there are two waterfalls, the eastern of which, being the larger, is more conspicuous.

On the south-eastern and south-western sides of the island, the

Charts 2202a, 2203, 2127, 2483.

Chart 1769.

cliffs rise abruptly from the sea, and on these sides the island appears to be literally inaccessible.

Depths of from 50 to 90 fathoms ($91^{m}4$ to $164^{m}6$) have been found at a distance of about 1½ miles from the coast on all sides of the island.

Kelp was reported on the north-eastern side of the island, in a depth of 12 fathoms ($21^{m}9$), at distances of from one quarter of a mile to half a mile offshore; but none was seen by H.M.S. *Yarmouth* in 1919.

Carlisle bay is a marked indentation at the north-eastern end of the island at the head of which there is a beach, a waterfall and the remains of a hut. The island was formerly inhabited and farmed for a short period, but now only a few score sheep and a head or two of cattle are pastured there. Vast numbers of sea birds breed, and fur seals and sea-elephants visit the island.

Fish are abundant in the surrounding waters and may readily be caught with hook and line. Penguins frequent the island to moult in March, return in August, and lay in September; the previous year's young visit the island to moult in December.

Dangers.—A rock, 3 feet ($0^{m}9$) high, lies about one cable offshore, close southward of East point, the eastern extremity of Inaccessible island.

Pyramid rock, 60 feet ($18^{m}3$) high, lies about 1½ cables south-westward of South hill, with a rock awash about half a mile westward of it, and a rock, 3 feet ($0^{m}9$) high, close southward of it.

Two other rocks awash lie off the south-western side of the island, the western and outer of which is about half a mile offshore.

A rock, 2 feet ($0^{m}6$) high, lies about one cable offshore near the centre of the north-eastern coast of the island.

Anchorage.—Anchorage may be obtained in a depth of 19 fathoms ($34^{m}7$), in Carlisle bay, with the waterfall at the head of the bay bearing 197°, distant 8 cables, but it should be used with caution, as the survey of the island is incomplete.

Good landing may be effected on the beach near the hut; from here a path leads to the top of the cliff. There is another landing place about 2 cables westward of the hut.

In 1904, H.M.S. *Odin* effected a landing by veering a boat in to the landing place shown on the chart, about midway between North and East points.

Nightingale, Middle, and Stoltenhof islands.—Aspect.—Nightingale island, the southern and largest of these three islands, has two peaks, the eastern of which is rugged and precipitous, 1,105 feet ($336^{m}8$) high, and appears conical when seen from north-eastward or south-westward. The other peak, 960 feet ($292^{m}6$) high, slopes gently on all but its southern side. With the exception of the north-eastern coast, the sides of the island are precipitous and cut into deep recesses and caves. *See* view on chart 1769, and facing page 337.

Stoltenhof island (*Lat. 37° 23′ S., Long. 12° 29′ W.*), the northernmost of this group, is situated about 8 cables northward of Nightingale island. It is a flat-topped precipitous rock, 325 feet ($99^{m}1$) high, and consists of one large and two small pieces, separated by narrow chasms which can only be distinguished on one particular bearing.

Middle island, situated as its name implies between the other two,

Charts 2202a, 2203, 2127, 2483.

Chart 1769.

is 150 feet ($45^{m}7$) high; Pin rock, about 30 feet ($9^{m}1$) high, lies off its north-western extremity.

General remarks.—This group apparently possesses no out-lying dangers. A few sunken rocks border the southern coast of Nightingale island, but their positions show up well.

There is a channel between Stoltenhof and Middle islands which is about one quarter of a mile wide and appears to be deep. The passage between Middle and Nightingale islands is 1½ cables wide, but it is completely blocked with detached rocks.

Kelp extends for about one-quarter of a mile offshore from the eastern sides of the islands; but there is less on their southern and western sides, which are the most exposed.

Depths of from 50 to 200 fathoms ($91^{m}4$ to $365^{m}8$), coral, have been found at a distance of about one mile offshore.

Nightingale island is visited by the settlers of Tristan island several times a year for birds, eggs and guano.

During the breeding season of Penguins and Great Shearwaters, walking on the island, except along the old Sealers road and on the plateau and ridges, is rendered difficult by the birds. Their nests and burrows occupy almost every inch of the ground, and tussock grass 8 to 9 feet ($2^{m}4$ to $2^{m}7$) in height overruns the island.

The water on Nightingale island tends to be tainted, possibly due to the number of birds; but drinkable water can be obtained in four large and several small ponds or bogs on the plateau below the lower peak, and also in a small bay 2 or 3 cables westward of the Sealers road leading from the north-east landing place.

Landing.—The old landing beach on the south-east side of the island is now seldom used, but landing may be most easily effected on the rocks, at the north-eastern extremity of Nightingale island. Caution should, however, be exercised, as there is a small rock awash about 50 yards ($45^{m}7$) from the point.

Chart 1769, plan of Gough island.

GOUGH ISLAND.—General remarks.—Aspect.—This island is situated about 230 miles south-south-eastward of Tristan island and lies between the parallels of 40° 17′ S. and 40° 24′ S., and the meridians of 9° 53′ W. and 10° 03′ W. Its northern and western sides consist of precipitous cliffs which attain near North point, at the north-western end of the island, an elevation of about 1,000 feet ($304^{m}8$), whence they gradually decrease in height until in the vicinity of South point they are from 50 to 100 feet ($15^{m}2$ to $30^{m}5$) high. Above these cliffs the land rises in rugged peaks towards the centre of the island where Mount Rowett, Hags Tooth, and High peak attain elevations of 2,915 feet ($888^{m}5$), 2,270 feet ($691^{m}9$), and about 2,800 feet ($853^{m}4$), respectively. *See* view on chart 1769.

The depths obtained in the vicinity of Gough island are few, but it is stated that the island may be approached in safety to a distance of about one mile, except off West and North East points where reefs extend offshore about 8 cables westward and 6 cables northward, respectively; that off West point breaks heavily. The island is apparently steep-to on all but its eastern side, where depths of 20 fathoms ($36^{m}6$) are found from half a mile to three-quarters of a mile offshore. Several islets or large rocks lie off the island, but

Charts 2202a, 2203, 2127, 2483.

Chart 1769, plan of Gough island.

with the exception of Penguin islet (*Lat. 40° 19′ S., Long. 9° 55′ W.*) they lie close inshore; the latter is situated about half a mile offshore near the centre of the north-eastern side of Gough island and is 340 feet ($103^{m}6$) high.

In most places the cliffs of Gough island rise steeply from the sea and numerous waterfalls drop vertically in long cascades. The coast is marked with numerous caves, and chasms. On the western and southern coasts, from North point round to South East point, there are no good anchorages and breakers extend about half a mile offshore in places. Snug harbour, situated close eastward of South West point, much belies its name, for there is practically no harbour at all. The point would offer a lee, and a useful anchorage might be found there during high north-westerly winds with no swell from southward or westward, but it would be necessary to lie much closer in than would be safe for any but the smallest vessel.

Close off the centre of the northern side of the island is a rock in the form of a rounded column about 200 feet ($61^{m}0$) high, known as Lot's Wife, eastward of which is an indentation in the coast, called Lot's Wife's cove.

Church rock is about 75 feet ($22^{m}9$) high and remarkable, and lies close off North East point; it obtains its name from its strong resemblance to a church with a high spire at its western end.

Close inshore and about 1¼ miles southward of Penguin islet are Dell rocks between which and Haulround point, situated about 1¼ miles farther south-eastward, is an indentation known as Quest bay.

At the northern end of Quest bay there is a glen which gives access to the interior of the island. The Glen beach is composed of large boulders and the approach to it is complicated by submerged rocks. A slight amount of protection is however given by Archway rock, where a stream runs down to the sea, and it is without doubt the continuous action of this stream that has worn the tunnel through the rock.

There are the remains of two huts in the glen, one of wood and corrugated iron, and the other, resembling those of Tristan island, is built of stone and roofed with tussock grass; both swarm with mice.

Anchorage.—There are no sheltered bays, each anchorage being an open roadstead. None of them can be considered safe for sailing vessels, and other ships anchoring should at all times be prepared to get under way at very short notice.

Temporary anchorage, according to the direction of the wind, can be obtained in Lot's Wife's cove, in the bay between Penguin islet and Dell rocks, and at the Glen anchorage in the northern part of Quest bay, at which last there is good holding ground.

H.M.S. *Royalist* took up a position just northward of Penguin islet abreast a cove, with the islet in line with South East point, in a depth of 17 fathoms ($31^{m}1$), soft sand; but it was not thought prudent to anchor on account of the swell then running. The *Quest* made use of the Glen anchorage where a depth of 12 fathoms ($21^{m}9$) was found.

The surf sometimes makes landing on the Glen beach difficult, not to say dangerous; but there is a place at the foot of Archway rock where experienced boatmen can effect a landing in almost any weather. At the corner of the rock nearest the northern end of the beach there

Charts 2202a, 2203, 2127, 2483.

Chart 1769, plan of Gough island.

is a chimney up which an active man carrying a coil of rope could clamber, and on the top of the rock there are a few island-trees to which it would be secured. In this way landing on, or departure from the island can be effected in any but the worst weather, though in the case of moving heavy gear, very hard work is entailed.

Landing can also be effected in Lot's Wife's cove (*Lat. 40° 18′ S., Long. 3° 58′ W.*), and southward of Church rock where there is an islet within which landing is safe and easy, as the place is protected from the swell and northerly winds by North East point; but the best position for landing will obviously depend on the direction of the wind and swell round the island at the time.

Chart 1769, plan of Bouvetøya.

BOUVETØYA.—Bouvetøya (*Lat. 54° 26′ S., Long. 3° 24′ E.*), formerly known as Bouvet island, lies about 1,000 miles south-south-eastward of Gough island and about 1,390 miles south-south-westward of the Cape of Good Hope.

It is under Norwegian Sovereignty and is fully described in the Antarctic pilot.

Charts 2202a, 2203, 2127, 2483.

APPENDIX I

SIMONS BAY.—REGULATIONS FOR DOCKYARD PORT

HIS EXCELLENCY THE GOVERNOR-GENERAL-IN-COUNCIL has been pleased under section four of the Simons bay Dockyard Port Regulation Statutes, 1898–1912, to make the following regulations and to cancel those published in the Gazette of the Colony of the Cape of Good Hope under Government Notice No. 732, dated 11th September, 1899.

1. The area of the Dockyard Port as defined by the statutes above mentioned is included within the following boundaries:—

> On the east so much as is comprised within a line drawn due south (true) from the Phoenix Buoy to the shore, meeting a line drawn north 32° west (true) from the Phoenix Buoy to the shore on the south of Elsey Bay; on the north-west, west, and south, the line of high-water mark of spring tides between the points where the above defined lines meet the shore, with all bays, creeks, lakes, pools, and rivers as far as the tide flows, which boundaries are delineated on a plan filed in the office of the Surveyor-General, marked 2,554 MM.

2. No vessel shall moor or anchor so as to obstruct navigation in or out of the Dockyard Port.

3. The Senior Naval Officer shall have exclusive right to lay down moorings within the area of the Dockyard Port. Merchant ships must anchor only in berths assigned to them by the Senior Naval Officer, or his representative. Freedom of access will be given at all times when the space is not required for His Majesty's ships and vessels.

4. No gunpowder or other explosive shall be allowed on board merchant vessels without the written permission of the Senior Naval Officer, and no merchant vessel shall be allowed to discharge loaded ordnance within the whole area of the Dockyard Port as laid down in section one of the "Simons Bay Dockyard Port Regulation Statutes, 1898–1912." The loading or unloading of gunpowder or other explosives shall be regulated by the Senior Naval Officer.

5. No merchant vessel shall be permitted to have on board any quantity of tar, oil, or other combustible substances beyond such as may be required for her general use within the limits of the Dockyard Port without the permission of the Senior Naval Officer.

6. The Senior Naval Officer is authorised from time to time, where the Naval Service requires it, to limit the speed of steam vessels to a speed not to exceed four knots within the limit of the Dockyard Port, as laid down in section one of the Act above quoted.

7. Every merchant vessel of and above 150 tons anchored or moored within the Dockyard Port shall have on board at least one person at all hours of the day and night.

8. If at any time the anchor of any merchant or other private vessel hooks any Government moorings, or any electric cables, or moorings of buoys, the master or other person having the charge or command of such vessel shall not proceed to unhook the same, but shall forthwith give notice thereof to the Senior Naval Officer in order that aid may be given for clearing such moorings or cables without doing damage to the same.

9. No merchant or other private vessel or boat shall, without licence in writing from the Senior Naval Officer, be moored or fastened to any Government moorings, buoys, piles, or vessels in the Dockyard Port.

10. No ballast, stones, earth, clay, refuse, ashes, rubbish, dust, filth of any description, and no refuse, from any quarry, mine or pit shall be unladen, cast, or allowed to fall into the waters of the Dockyard Port, except in such places as are appointed by the Senior Naval Officer, or into or upon the banks, or any portion of the shore of the said Dockyard Port, or into or upon the shores of any rivers or streams discharging into the said Dockyard Port where the same may be liable to be washed into the waters of the Dockyard Port by rain, tide, or otherwise.

11. Nothing, however, in the foregoing provisions shall be deemed to exclude such vessels as require admission to the town pier for loading and unloading cargoes ; and all such vessels shall continue to enjoy their accustomed privileges in this respect as fully as if these regulations had not been made, provided they do not impede or interfere with the navigation of His Majesty's vessels.

12. The master of every vessel to which these regulations relate shall observe and cause them to be observed so far as they relate to his vessel, and if any master or other person acts in any respect in contravention of any of these regulations, or fails to observe or cause to be observed, in any respect, any of them, he shall be liable on conviction to a penalty not exceeding ten pounds, or to imprisonment with or without hard labour for a period not exceeding three months.

APPENDIX II

LIST OF PORTS AVAILABLE FOR UNDER-WATER REPAIRS, with details of Largest Dry or Floating Dock or Patent Slip at each Port.

NAME OF PORT AND TYPE OF DOCK, &c.	Length from bilge of caisson or mitre post of gates at		Maximum length of keel blocks (3) Feet	Breadth of entrance at		‡ Distance {below (+) above (−)} Chart datum level of			Springs rise (9) Feet	FLOATING DOCKS, PATENT SLIPS, &c.			REMARKS (13)
	Coping head (1)* Feet	Floor head (2)* Feet		Coping (4)† Feet	MHWS level (5)† Feet	Sill (6) Feet	Blocks, at			Maximum depth over blocks		Lifting power (12) Tons	
							Entrance (7) Feet	Head (8) Feet		Forward (10) Feet	Aft (11) Feet		
DOUALA: Floating dock	203·3	—	—	—	42·5	—	—	—	—	14·0	14·0	1,200	
POINTE-NOIRE: Patent slip	—	—	—	—	—	—	—	—	—	—	—	500	
BOMA: Floating dock	238·5	—	213·25	59·0	52·4	—	—	—	—	16·0	16·0	1,765	
LUANDA: Patent slip	131·0	—	—	35·0	—	—	—	—	—	—	—	500	
WALVIS BAY: Patent slip	685·0	172·0	—	30·0	—	—	—	—	—	13·0	23·0	1,000	
LÜDERITZ: Patent slip§	92·5	62·5	—	27·6	—	—	—	—	—	7·6	7·6	250	§Broadside slipway.

* In the case of floating docks, patent slips, &c., Column (1) = Extreme length. Column (2) = Length on blocks or cradle.

† In the case of floating docks, column (4) = Breadth at top. Column (5) = Breadth at bottom of dock.

‡ In order to find the depths on sill, &c., the quantities in columns (6), (7) and (8), should be applied according to sign to the predicted or calculated height of tide as obtained from the Admiralty Tide Tables.

LIST OF PORTS AVAILABLE FOR UNDER-WATER REPAIRS, with details of Largest Dry or Floating Dock or Patent Slip at each Port (*continued*).

NAME OF PORT AND TYPE OF DOCK, &c.	Length from bilge of caisson or mitre post of gates at		Maximum length of keel blocks	Breadth of entrance at		‡ Distance {below (+) above (−)} Chart datum level of			Springs rise	FLOATING DOCKS, PATENT SLIPS, &c.			REMARKS
	Coping head	Floor head		Coping	MHWS level	Sill	Blocks, at			Maximum depth over blocks		Lifting power	
							Entrance	Head		Forward	Aft		
	(1)*	(2)*	(3)	(4)†	(5)†	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Tons	
Port Nolloth: Patent slip	385·0	80·0	—	21·7	—	—	—	—	—	4·5	6·5	120	
Table Bay: Sturrock Dock	1,181·0	1,212·4‖	—	148·0	146·25	+ 40·0	+ 40·0	+ 40·0	5·0	—	—	—	‖Floorhead to outer stop. Two intermediate grooves allow dock lengths of 674 ft. and 469 ft.; 434 ft. and 709 ft.
Simonstown: Selborne Dock	779·8¶	763·5¶	685·0**	95·0	94·0	+ 30·5	+ 30·5	+ 29·5	5·46	—	—	—	**Can be extended to 710 feet. ¶Caisson in outer stop. Two intermediate grooves allow dock lengths of 256·3 ft. and 494·25 ft.; 406·3 ft. and 344·25 ft.

* In the case of floating docks, patent slips, &c., Column (1) = Extreme length. Column (2) = Length on blocks or cradle.

† In the case of floating docks, column (4) = Breadth at top. Column (5) = Breadth at bottom of dock.

‡ In order to find the depths on sill, &c., the quantities in columns (6), (7) and (8), should be applied according to sign to the predicted or calculated height of tide as obtained from the Admiralty Tide Tables.

APPENDIX III

LIST OF PRINCIPAL PORTS AND ANCHORAGES, SHOWING PARTICULARS OF DEPTHS, ETC.

PORT OR ANCHORAGE	Depth below Chart datum level		Rise of tide		REMARKS
	In channel of approach	In anchorage	Spgs.	Nps.	
Fernando Póo :			Feet	Feet	
Santa Isabel . . .	7 to 13 fms.	9 to 14 fms.	7	—	Open north-westward.
Bahia de San Carlos .	Deep	8 to 20 fms.	7	—	Open north-westward.
Principe :					
Santo Antonio . .	5½ fms.	5½ to 10 fms.	4¾	—	Open eastward.
São Tomé :					
Baia de Ana de Chaves	5 to 6 fms.	4 to 5 fms.	4¾	—	Open roadstead.
Man-of-War roadstead	Deep	7 fms.	—	—	Open roadstead.
Ilhéu das Rôlas . .	Deep	5 fms.	—	—	Open roadstead, sheltered from south - easterly winds.
Annobon :					
San Antonio . . .	Deep	10 to 15 fms.	4½	—	Open roadstead.
British Cameroons :					
Rio del Rey . . .	Abt. 2½ fms.	3¼ fms.	—	—	Up river.
Bibundi	Deep	6 fms.	—	—	Open roadstead.
Izongo	Deep	9 fms.	—	—	Open roadstead.
Victoria	7 fms.	5½ to 6 fms.	6½	5¼	Open south-westward.
Tiko	22 ft.	16 to 23 ft.	7½	5	15 ft. alongside wharf.
French Cameroons :					
Douala	*13½ ft.	23 to 33 ft alongside	7¾	5¾	*Vessels drawing 21 ft. can ascend at H.W. springs.
Bonaberi	13½ ft.	26 ft. alongside	—	—	ditto
Longji	5 to 10 fms.	4 fms.	—	—	Open roadstead.
Kribi	10 to 50 fms.	9 to 10 fms.	6	4	Open roadstead.
Grand Batanga . .	10 to 50 fms.	5½ to 6½ fms.	—	—	Open roadstead.
Spanish Guinea :					
Bata	7 to 50 fms.	6½ fms.	5	—	Open roadstead.
Benito	5 to 50 fms.	4 fms.	4½	3½	Open roadstead.
Kongo	Ab. 4 fms.	5 to 7 fms.	—	—	Rio Muni, at mouth of Rio Kongue.
Bahia de Corisco . .	14 to 26 fms.	2 to 12 fms.	7	—	Good anchorage.

LIST OF PRINCIPAL PORTS AND ANCHORAGES, SHOWING PARTICULARS OF DEPTHS, ETC. (*continued*)

PORT OR ANCHORAGE	Depth below Chart datum level		Rise of tide		REMARKS
	In channel of approach	In anchorage	Spgs.	Nps.	
French Equatorial Africa:			Feet	Feet	
Libreville	6 fms.	4 to 5 fms.*	8	—	In Rivière Gabon.* 13 ft. alongside Libreville wharf.
Port Gentil . . .	Deep	6 to 10 fms.	6½	5¼	Open northward.
Setté Cama . . .	Deep	4½ to 7 fms.	—	—	Open roadstead.
Mayumba	Deep	6 to 8 fms.	7	—	Open roadstead.
Loango	16 fms.	4¾ fms.	5¼	4¼	Open north westward.
Pointe-Noire . . .	7 to 10 fms.	4½ to 6 fms.	5¼	4¼	Vessels up to 30 ft. draught can lie at quays. One vessel of 23 ft. draught can anchor inside harbour.
Cabinda :					
Massabi	Deep	5¼ fms.	5	—	Open roadstead.
Landana	9 to 10 fms.	5 fms.	—	—	Open roadstead.
Malembo	Deep	5 to 6 fms.	—	—	Open, except for small craft.
Baia de Cabinda . .	Deep	3¼ to 3½ fms.	—	—	Open, except for small craft.
Belgian Congo :					
Banana	15 ft.	19 ft.	6	—	In creek.
Malela	6½ fms.	4½ to 7 fms.	5	—	In creek.
Boma	25 ft.	17 to 27 ft.	¾	—	
Ango Ango . . .	25 ft.	35 ft. *	—	—	*Alongside piers.
Matadi	25 ft.	17 to 23 ft.	—	—	
Angola :					
Mucula.	5 to 6 fms.	3½ fms.	—	—	Open roadstead.
Ambrizete . . .	Deep	5 fms.	5	—	Open roadstead.
Ambriz	Deep	7 to 10 fms.	—	—	Open roadstead.
Luanda	14 to 17 fms.	7 to 14 fms.	4¾	—	Good sheltered anchorage. Depths of 32 ft. alongside quay.
Pôrto Amboim . .	Deep	3 to 15 fms.	—	—	Open westward and north-westward.
Novo Redondo . .	Deep	4 to 7 fms.	—	—	Open roadstead.
Quicombo	Deep	4½ to 5 fms.	—	—	Unsafe with rollers.
Lobito	Deep	18 fms.	5½	—	34 ft. alongside wharves.
Baia de Benguela. .	Deep	7 to 10 fms.	4½	3¼	Open from west to north.
Baia Farta . . .	Deep	14 fms.	—	—	Excellent anchorage.
Baia dos Elefantes .	Deep	10 to 16 fms.	5	—	Sheltered anchorage.
Baia das Tainhas .	Deep	17 fms.	—	—	
Baia das Salinas . .	Deep	8 to 10 fms.	—	—	Open north-westward.
Mossamedes . . .	Deep	6 to 7 fms.	5½	—	Open from north to north-west.

LIST OF PRINCIPAL PORTS AND ANCHORAGES, SHOWING PARTICULARS OF DEPTHS, ETC. (*continued*)

PORT OR ANCHORAGE	Depth below Chart datum level		Rise of tide		REMARKS
	In channel of approach	In anchorage	Spgs.	Nps.	
Angola—*contd.*			Feet	Feet	
Pôrto Alexandre . .	Deep	16 to 20 fms.	5	—	Sheltered. Less water reported (1923).
Baia dos Tigres . .	Deep	6 to 15 fms.	5	3½	Open northward only.
South-West Africa :					
Walvis bay . . .	29 ft.	29 to 30 ft.*	5	3½	*Alongside wharf.
Spencer bay . . .	Deep	6 fms.	—	—	Sheltered by Merker island.
Itshabo island . .	Deep	5½ to 7 fms.	7	4	Fair anchorage.
Lüderitz bay . . .	Deep	3 to 6 fms.	5½	4¼	Good and fairly well sheltered anchorage.
Possession road . .	6 to 20 fms.	4 to 5 fms.	4½	—	Good anchorage.
Cape of Good Hope province :					
Port Nolloth . . .	Deep	23 fms.	5¼	3½	Inner anchorage, 10 ft.
St. Helena bay . .	Deep	5 to 7 fms.	6	—	Open northward.
Saldanha bay . . .	Deep	4 to 6 fms.	5	3½	Good sheltered and commodious anchorage.
Yzerfontein . . .	Deep	15 ft.*	—	—	*Alongside jetty.
Dassen island . . .	Deep	10 to 14 fms.	—	—	Open anchorage.
Table bay	Deep	4 to 8 fms.	5	3½	10 to 43 ft. alongside in basins.
Hout bay	Deep	3½ fms.	5	—	Open to south-westerly winds.
Simons bay . . .	Deep	4 to 10 fms.	6	4½	Basin 29 to 48 ft.
Ascension island :					
Clarence bay . . .	Deep	10 to 11 fms.	3	—	Open roadstead.
St. Helena island :					
James bay. . . .	Deep	17 to 25 fms.	3	—	Open roadstead.
Tristan da Cunha group :					
Tristan island . .	Deep	30 fms.	5	—	Temporary. For vessels under steam only.
Inaccessible island .	Deep	19 fms.	—	—	Temporary. For vessels under steam only.
Gough island :					
Glen anchorage . .	Deep	12 fms.	—	—	Temporary. For vessels under steam only.

APPENDIX IV

LIST OF SPOTS SUITABLE FOR MAGNETIC OBSERVATIONS.

Place	Lat., Long.	Position
Port Gentil	0° 43′ S. 8° 46′ E.	On open ground south-westward of the property of Hatton and Cookson, north-westward of the property of Chargeurs Réunis; 32 yards westward of centre of cement walk through town; marked by concrete monument 3 feet square, into which is set a concrete block 8 inches by 8 inches which extends about 4 inches above surface of ground, and is marked "C.I.W. 1915." True bearings: Cap Lopez navigation mark 223° 23′; west gable of Hatton and Cookson warehouse 065° 23′; north gable of Chargeurs Réunis residence 096° 56′; windmill 161° 03′.
Luanda	8° 49′ S. 13° 14′ E.	On property of American Mission, near edge of cliff overlooking railroad, and 80 feet North of north-west corner of concrete veranda on west side of most northerly of mission buildings; marked by cross cut in top of concrete block 20 by 25 centimetres with top face lettered "C.I.W. 1915." and standing 6 centimetres above ground surface. True bearings: signal staff at observatory, 1¼ miles, 269° 41′·3; flagstaff at fort, 1¼ miles, 294° 15′·7; chimney stack at gasworks, 2 miles, 37° 56′·7; north gable of mission church, 295 feet, 154° 49′·9.
Luanda (alternative)	8° 49′ S. 13° 13′ E.	In centre of levelled ground at rear of Joao Capello Observatory and gardens, marked by slab of granite 4 by 12 by 18 inches, set flush with ground surface, cross in centre indicating exact spot. True bearings: tip of small summer house on bluff, 188° 21′·8; west side of Fort Miguel, 355° 56′·4; western vane of Governor's palace, 148° 41′·4.
Lobito	12° 21′ S. 13° 34′ E.	About 300 yards south of new railroad water tank, south of low wet ground, on sea side of main auto road to Benguela, 80 feet from centre of this road, in line with north end of football field, in centre of north and south path and 18½ feet south of intersection of this path with east and west path; marked by tent peg driven flush with ground. True bearings: north-east corner of European hospital, 270 yards, 307° 42′·7; west edge of transformer house, 330 yards, 40° 47′·0; lighthouse on mainland, 6 miles, 61° 09′·1; tip on chimney of bakery, 440 yards, 111° 09′·3.

LIST OF SPOTS SUITABLE FOR MAGNETIC OBSERVATIONS *(continued)*

Place	Lat., Long.	Position
Mossamedes	15° 11′ S. 12° 09′ E.	In enclosure of Eastern Telegraph Company, in centre of open court south of main building of Cable Station, 130 feet from concrete irrigation conduit; marked by concrete block 4 by 4 by 13 inches set flush with ground surface, cross on top indicating exact spot. True bearings: east gable of white house, 440 yards, 221° 49′·3; radio mast 380 yards, 257° 08′·2; south-west corner of main building of cable station, 295° 58′·0; south-east edge of bathhouse, 100 yards, 347° 50′·7.
Ascension island	7° 56′ S. 14° 25′ W.	Georgetown.—On an open space near the observation stone, just northward of the tennis court, from which the signal station flagstaff bears 098° 55′·5.
Ascension island	7° 57′ S. 14° 21′ W.	Green mountain.—On a grass plot outside the enclosure of North-east cottage.
St. Helena island	15° 57′ S. 5° 41′ W.	On the lawn in front of the house in which Napoleon died, 58 yards (53^m5) west-south-westward of the south-western corner of the northern gate post, 37¼ yards (34^m1) north-westward of the western corner of the masonry support for three water tanks, and 14¼ yards (13^m1) due southward of the point in line with a flax hedge; marked by an oak stake bound round the top with a brass ferrule.
Tristan island	37° 03′ S. 12° 19′ W.	In a depression on Malcolm point; a grassy slope about 30 feet (9^m1) above the sea.

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